Curriculum Vitae

ANIRUDH MODI

Institute for High Performance Computing Applications
Pennsylvania State University
235 Hammond Building
State College, PA 16802

E-mail address: anirudh@anirudh.net
Office telephone: (814) 865-1965
Home telephone: (814) 867-5867
Personal fax: (253) 323-4540

445 Waupelani Dr., Apt H7
State College, PA 16801

http://www.anirudh.net/

Citizenship: India

Education:

1999–Present	*Pennsylvania State University*, University Park, PA Ph.D. in Computer Science and Engineering, August 2002 (expected) Thesis advisor: Paul E. Plassmann and Lyle N. Long
1997–1999	*Pennsylvania State University*, University Park, PA M.S. in Aerospace Engineering, May 1999 Thesis advisor: Lyle N. Long
1993–1997	*Indian Institute of Technology*, Bombay, India B.Tech. in Aerospace Engineering, April 1997 Thesis advisor: G. R. Shevare

Employment:

1999–Present	*Pennsylvania State University*, University Park, PA Graduate Research Assistant (Computer Science), Chief Beowulf Architect and Maintainer (Aerospace Engineering)
1997–1999	*Pennsylvania State University*, University Park, PA Graduate Research Assistant (Aerospace Engineering)
Summer 1997	*Indian Institute of Technology (IIT)*, Bombay, India Project Engineer, Department of Aerospace Engineering
Summer 1996	*National Centre for Software Technology (NCST)*, Bombay, India Summer Intern, Computer Graphics Division
1995-1997	*Indian Institute of Technology (IIT)*, Bombay, India Student Software Developer, IITZeus Grid Generation Project, Department of Aerospace Engineering

Fields of Interest:

Computational steering, parallel algorithms for scientific computation, interactive virtual environments, mesh generation, next-generation software systems for scientific computing.

Honors and Awards:

1998-2000	Rotorcraft Center of Excellence (RCOE) Fellowship, Pennsylvania State University
1997–1998	High Performance Computing (HPC) Fellowship, Pennsylvania State University
1997	Certificate of merit for finishing in the Top-5 among over 1000 participants in the *Computer Concepts and Programming Examination* conducted by *National Centre for Software Technology* (NCST), Bombay.
1997	Secured 2nd position in Graduate Aptitude Test in Engineering (GATE) among several thousand applicants for graduate study at the IITs in India.
1992, 1993	Secured 2nd and 4th positions, respectively, in IIT-Bombay Annual Math Olympiad among over 1000 participants from all over India.
1992	Selected to appear for the Indian National Math Olympiad as one of the Top-500 student mathematicians in India.

Invited Talks (Selected):

January 2002	Three talks on *Introduction to Linux* and *Beowulf Clusters*, *Object Oriented Programming* (AE 597E)
January 2001	Talk on *Building and Maintaining Beowulf Clusters*, *Numerical Methods on Parallel Computers* (AE 597D)
November 2000	Talk on *Building and Maintaining Beowulf Clusters*, *Penn State University Linux Users Group* Meeting
September 2000	Talk on *Building and Maintaining Beowulf Clusters*, *Numerical Methods on Parallel Computers* (AE 597C)
April 1999	Talk on *Unsteady CFD using a Cluster of Workstations*, *Numerical Methods on Parallel Computers* (AE 597C)

Personal: Born April 3, 1975 in Ranchi, India.

Project Experience:

Ph.D. Dissertation (1999–Present)
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 knowledge related to software systems, computational steering, virtual reality systems, computer graphics, high performance computing, numerical simulations and networking, and 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 (2000–Present)
Built a 50 processor Pentium III PC cluster similar to COCOA. I currently manage the cluster. More information on COCOA-2 (COst effective COmputing Array 2) can be obtained at its website: http://cocoa2.ihpca.psu.edu/

M.S. Thesis (1997–1999)
On a Graduate Research Assistantship 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 (IHPCA) working on a thesis 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 (1998–Present)
Built a 50 processor Pentium II PC cluster running Linux for our research group to run parallel codes, tackling all the hardware/software problems single-handedly. Currently, I play a key role in helping build more such clusters across the campus, and also managing and administer the entire system. More information on COCOA (COst effective COmputing Array) can be obtained at its website:
http://cocoa.ihpca.psu.edu/

Course Projects (1997–2001)
I have had a range on courses in the field of Numerical and High Performance Computing, Computer Graphics, Computer Vision and Database Systems. Most of course projects and reports can be found on the web at: http://www.anirudh.net/courses.html.
Specifically, projects related to my computer vision and digital image processing related courses can be found on the web at: http://www.anirudh.net/courses/vision.html

Software Development (1997–1997)
Worked as a Project Engineer for the "*Spirogramme Project*" under Prof. S.K. Sane (*sanesk@aero.iitb.ernet.in*). The project involved developing a Graphical Interface for DOS based PCs in C and FORTRAN 77 for an instrument devised to measure the small air-flow rates, specifically aimed at Asthma patients for use in hospitals.

B.Tech. Thesis (1996–1997)
Worked towards a B.Tech. thesis titled "*Unstructured 2D/3D Mesh Generation using Graded Triangulation*" under the guidance of Prof. G.R. Shevare (*shevare@aero.iitb.ernet.in*). The work involved the study and implementation of various triangulation methods such as Advancing Front Triangulation and Delaunay Triangulation and their variants. The complete report is available on the web at: http://www.anirudh.net/btp/

Summer Training (1996–1996)
On a summer internship in National Centre for Software Technology (NCST), Bombay, working under the supervision of 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*". The work involved the implementation of Weiler-Atherton Polygon Clipping algorithm (handling all the special cases) in C with a graphical interface written using the X11 libraries. The complete report is available on the web at: http://www.anirudh.net/practical_training/

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 programming. I also have experience in cross-platform GUI programming using the FLTK API and 3D visualization using the *Visualization Toolkit* (VTK). I am fluent in the use of Tecplot (for post-processing and visualization), Mathematica, MATLAB, LaTeX, Cantata/Khoros (for image processing) and several other GNU software.

- 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 wit h 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.

Publications [1]

1. 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.

2. 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.

3. Turbulent Flow and Aeroacoustics Simulations using a Cluster of Workstations, L. N. Long and A. Modi, *Linux Revolution Conference*, Champaign, IL, June 2001.

4. Unsteady Separated Flow Simulations using a Cluster of Workstations, A. Modi and L.N. Long, **AIAA 2000-0272**, *38th AIAA Aerospace Sciences Meeting*, Reno, NV, January 2000.

5. Unsteady Separated Flow Simulations using a Cluster of Workstations, A. Modi, L.N. Long and R.P. Hansen, *International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA)*, Las Vegas, NV, June 1999.

6. 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.

[1] Recent papers and preprints are available on the web at `http://www.anirudh.net/`