

# Hyung Taek Ahn

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**Citizenship:** South Korea (Republic of Korea)

**Visa Status:** H1-B

**Career Objective**

Towards more accurate and efficient simulation of multi-physics phenomena

**Research Interests**

Fluid/structure interaction  
Multi-phase/Multi-material flow simulation  
Micro/Biological fluid mechanics  
Unstructured hybrid mesh methods for CFD  
Compressible/Incompressible flow solvers

**Education**

Ph.D. in Aerospace Engineering The University of Texas at Austin	Aug. 1999 - May 2005
M.S. in Mechanical Engineering Korea Advanced Institute of Science and Technology (KAIST), Korea	Mar. 1997 - Feb. 1999
B. Eng. in Mechanical Engineering Yeungnam University, Korea	Mar. 1992 - Feb. 1996

## Employment

Postdoctoral Research Associate Mathematical Modeling and Analysis (Group T-7) Theoretical Division Los Alamos National Laboratory	Jun. 2006 - Present
Research Associate Institute for Computational Engineering and Sciences The University of Texas at Austin	Jun. 2005 - May 2006
Instructor (Adjunct Professor) Dept. of Aerospace Engineering and Engineering Mechanics The University of Texas at Austin	Aug. 2005 - May 2006
Research/Teaching Assistant Dept. of Aerospace Engineering and Engineering Mechanics The University of Texas at Austin	Aug. 1999 – May 2005
Research Engineer Research Headquarter Samsung Display Instruments, Inc., Korea	Jan. 1999 – May 1999

## Publications (published)

1. H. T. Ahn, M. Shashkov, and M. A. Christon, The Moment-of-Fluid Method in Action, LA-UR-07-6854, Los Alamos National Laboratory, 2007, submitted to the Communications in Numerical Methods in Engineering.
2. H. T. Ahn and M. Shashkov, Multi-material interface reconstruction on generalized polyhedral meshes, Journal of Computational Physics, Volume 226, Issue 2, 1 October 2007, Pages 2096-2132
3. H. T. Ahn and M. Shashkov, Geometric algorithms for 3D interface reconstruction, 16th International Meshing Roundtable, Accepted for publication, 16th International Meshing Roundtable, Oct. 14-17, 2007, Seattle, WA. ( to appear in a special issue of Engineering with Computers, published by Springer)
4. H. T. Ahn and M. Shashkov, Multi-material interface reconstruction on generalized polyhedral meshes , LA-UR-07-0656, Los Alamos National Laboratory, 2007
5. H. T. Ahn and G. F. Carey, An enhanced polygonal finite-volume method for unstructured hybrid meshes, International Journal for Numerical Methods in Fluids, Volume 54, Pages 29-46, 10 May 2007
6. H. T. Ahn and Y. Kallinderis, Strongly coupled flow/structure interactions with a geometrically conservative ALE scheme on general hybrid meshes, Journal of Computational Physics, Volume 219, Pages 671-696, 2006
7. Y. Kallinderis and H. T. Ahn, Incompressible Navier-Stokes method with general hybrid meshes,

Journal of Computational Physics, Volume 210, Pages 75-108, 2005, *Ranked 5th in the Top 25 Hottest Articles, Journal of Computational Physics, Jul.-Sep. 2005*

8. H. T. Ahn, A new incompressible Navier-Stokes method with general hybrid meshes and its application to flow/structure interactions, Ph.D. Thesis, The University of Texas at Austin, TX, 2005
9. H. T. Ahn and Y. Kallinderis, CFD Investigation of the Effect of Current Turbulence on the Hydrodynamic Forces on a Cylinder, 24th International Conference on Offshore Mechanics and Arctic Engineering (OMAE 2005), June 2005, Halkidiki, Greece
10. Y. Kallinderis and H. T. Ahn, Strongly Coupled Fluid-Structure Interactions via a New Navier-Stokes Method for Prediction of Vortex-Induced Vibrations, 24th International Conference on Offshore Mechanics and Arctic Engineering (OMAE 2005), June 2005, Halkidiki, Greece

### **Publications (in review/preparation)**

1. H. T. Ahn, M. Shashkov, Adaptive Moment-of-Fluid Method, Journal of Computational Physics, to be submitted
2. H. T. Ahn, L. Branets, and G.F. Carey, Moving Boundary Simulations with Dynamics Mesh Smoothing, International Journal for Numerical Methods in Fluids, to be submitted
3. H. T. Ahn, M. Shashkov, Topology-aware-advection (TOAD) scheme for moment-of-fluid method, in preparation
4. H. T. Ahn, Inflow turbulence effect on the vortex-induced vibration of an elastically mounted cylinder, in preparation

### **Conference/Invited Talks**

- Third Asian-Pacific Congress on Computational Mechanics (APCOM'07), Dec. 3-6, 2007, Kyoto, Japan
- 60th APS/DFD Meeting, Nov. 18-20, 2007, Salt Lake City, UT
- 16th International Meshing Roundtable, Oct. 14-17, 2007, Seattle, WA
- The 9th U.S. National Congress on Computational Mechanics (USNCCM9), July 23-26, 2007, San Francisco, CA,
- 14<sup>th</sup> International Conference on Finite Element in Flow Problems (FEF 2007), Mar. 27-28, 2007, Santa Fe, NM, USA
- Center for Applied Scientific Computing, Lawrence Livermore National Laboratory, Feb. 28, 2007, Livermore, CA (Host: D. Bailey and A. Koniges)
- SIAM conference on Computational Science and Engineering (SIAM-CSE07), Feb. 19-23, 2007, Costa Mesa, CA
- 7th World Congress on Computational Mechanics (WCCM7), Jul. 16-22, 2006, Los Angeles, CA
- Center for Nonlinear Studies, Los Alamos National Laboratory, Oct. 2005, Los Alamos, NM (Host: M. Shashkov)
- 8th U.S. National Congress on Computational Mechanics (USNCCM8), Jul. 25-27, 2005, Austin, TX

## **Skills**

- Expert knowledge in C/C++, and working knowledge in Fortran 77/90/95, MIPS/LC-2 Assembly (in the order of fluency)
- Expert knowledge in MPI Parallelization (developed 3D Flow/Structure Interaction solver using MPI)
- High Performance Computing experience on Lonestar machine (Dell Dual-Core Linux Cluster, Peak Performance: 55.5 TFLOPS) at Texas Advanced Computing Center (TACC), UT-Austin
- Working knowledge in Software tools: Matlab, Mathematica, LaTeX, ParaView, Tecplot, FieldView, GMV
- Native speaker of Korean; Fluent in English; Intermediate in Japanese

## **Awards and Honors**

- Ranked 5th in the Top 25 Hottest Articles, Journal of Computational Physics, Jul.-Sep. 2005; Y. Kallinderis and H. T. Ahn, Incompressible Navier-Stokes method with general hybrid meshes, Journal of Computational Physics, Volume 210, Pages 75-108, 2005
- Rotary Foundation Ambassadorial Scholarship, Rotary International, 1999-2002
- State Scholarship, Korea Advanced Institute of Science and Technology (KAIST), Korea 1997-1999
- Merit-based Scholarship (Ranked No. 1 among the class of 300 in the academic years of 1994 – 1996), Yeungnam University, Korea, 1994-1996

## **Activities and Services**

- Reviewer for the International Journal for Numerical Methods in Fluids
- Reviewer for the Communications in Numerical Methods in Engineering
- Reviewer for the International Meshing Roundtable, sponsored by Sandia National Laboratories
- Co-organizer for Mini-symposium on Modeling and simulation of multi-phase and multi-material flows, The 9th U.S. National Congress on Computational Mechanics (USNCCM9), San Francisco, CA, July 23-26, 2007
- Member of U.S. Association for Computational Mechanics (USACM)
- Member of Society for Industrial and Applied Mathematics (SIAM)
- Member of American Institute of Aeronautics and Astronautics (AIAA)
- Member of American Society Of Mechanical Engineers (ASME)
- Member of American Physical Society (APS)