Sangho Kim

Department of Aeronautics & Astronautics
Stanford University
Stanford, CA 94305
(650) 724-5479
sangho@Stanford.EDU
http://aero-comlab.stanford.edu/sanghok

DATE OF BIRTH **April 18 1966. Korea.**

EDUCATION

Stanford University (*October 1993 - December 2001***)**
Ph.D. Aeronautics & Astronautics (*April 1996 - December 2001*). The field of specialization is Computational Fluid Dynamics (CFD) and the emphasis of my Ph.D. research has been on Aerodynamic Shape Optimization (ASO) using an adjoint-based method. Dissertation topic investigates the design optimization of high-lift configuration using a viscous adjoint-based method.

Master of Science in Aeronautics & Astronautics (*October 1993 - April 1996*). Studies focused on aerodynamics and computational methods in fluid mechanics. Selected courses include: CFD, Applied Aerodynamics, Experimental Fluid Mechanics, Combustion, Rocket Propulsion, Atmospheric Entry, Plasma Physics, Probability and Stochastic Processes in Aeronautics, Analysis of Structures, Dynamics and Feedback Control Design, and Programming Methodology in Software Engineering. GPA: 3.7/4.0.

Kyunghee University (*March 1985 - February 1988, March 1991 - February 1992***)**
Bachelor of Science degree in Astronomy & Space Science. Studies focused on Classical & Modern Physics and Mathematical & Computational Methods in the Physical Sciences. Graduated with First Class Honors. GPA: 3.9/4.0. Ranked 1^{st} out of 250 students in the School of Sciences.

EXPERIENCE

Stanford University Stanford, CA
Post-Doctoral *December 2001 - Present*
Multi-Disciplinary Optimization(MDO)/ASO using Reduced Adjoint Method.
Working on Integration of Reynolds-Averaged Navier-Stokes (RANS) and Large Eddy Simulation (LES) flow solvers for simultaneous flow computations in the Advanced Simulation and Computing Initiative (ASC) project of the Department of Energy (DOE) at Stanford.
Working on ASO for Quiet Supersonic Platform (QSP) Design.
Various three dimensional ASO including Boeing Wing-Body Configuration Re-Design.

Consulting for Boeing Company. *January 2002 -March 2002*

Research Assistant *August 2001 - December 2001*
Aerodynamic Shape Optimization for Sonic Boom Reduction. Developed tools for providing near field pressure signature for QSP design by solving an inverse problem.

Research Assistant *December 1997 - July 2001*
Developed tools for two-dimensional high-lift aerodynamic system design using automatic, adjoint-based optimization methods. A two-dimensional multi-block Reynolds-Averaged Navier-Stokes (RANS) equation solver with the Spalart-Allmaras turbulence model and an adjoint equation solver were implemented. Parallel computations were performed using the Message Passing Interface (MPI) communication standard. The accuracy of the viscous adjoint sensitivity derivatives was validated by a detailed numerical study.

Independent Research *Fall 1997*
Implemented a continuous adjoint-based design method using the Euler equations. Reviewed the formulation of the adjoint equations for aerodynamic shape design in viscous compressible flow modeled by the RANS equations.

Independent Research *Fall 1995*

Conducted computations of internal turbulent flows in a converging/diverging nozzle. A fully-implicit time marching algorithm for the solution of the RANS equations was implemented.

Korean Augmentation to the U.S. Army Korea
Sergeant *July 22 1988 - October 18 1990*

AWARDS

Advisor's Selection. Terman Engineering Fellowship, Stanford University, Fall 1997 - Spring 2001.
Graduated Summa Cum Laude, Kyunghee University, February 1992.
University President' Scholarship, Dean's List, Kyunghee University, 1985-1988, 1991-1992.

PUBLICATIONS

Journal Papers

A Framework for Coupling Reynolds-Averaged with Large Eddy Simulations for Gas Turbine Applications, (with J. Schluter, X. Wu, J.J. Alonso and H. Pitsch). Journal of Fluids Engineering. Submitted 2004.

Reduction of the Adjoint Gradient Formula for Aerodynamic Shape Optimization Problems, (with A. Jameson). AIAA Journal, vol. 41, no. 11, pp. 2114-2129.

Multi-Element High-Lift Configurations Design Optimization Using Viscous Continuous Adjoint Method, (with J.J. Alonso and A. Jameson). no. 41, no. 1(Tentative), Journal of Aircraft. Accepted to be published in 2004.

Conference Papers

Progress in Coupled LES-RANS Computations of Gas Turbines, (with J.U. Schluter, X. Wu, H. Pitsch and J.J. Alonso). 5th International ASME/JSME Symposium on Computational Technology for Fluid/Thermal/Chemical/Stressed Systems with Industrial Applications. La Jolla, CA, July 2004.

Coupled RANS-LES Computation of a Compressor and Combustor in a Gas Turbine Engine, (with J.U. Schluter, X. Wu, H. Pitsch and J.J. Alonso).
40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, CA, July 2004. AIAA Paper 2004-3417.

Integrated Simulations for Multi-Component Analysis of Gas Turbines:RANS Boundary Conditions, (with J.U. Schluter, X. Wu, H. Pitsch and J.J. Alonso).
40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, CA, July 2004. AIAA Paper 2004-3415.

Integrated RANS-LES Computations in Gas Turbines:Compressor-Diffuser, (with J.U. Schluter, S. Shankaran, H. Pitsch, P. Moin, and J.J. Alonso). 42th AIAA Aerospace Sciences Meeting & Exhibit, Reno, NV, January 2004. AIAA Paper 2004-0369.

Viscous Aerodynamic Shape Optimization of Wings Including Planform Variables, (with K. Leoviriyakit and A. Jameson). FL Summer Co-located Conferences, Orlando, FL, June 2003. AIAA Paper 2003-3498.

Towards Multi-Component Analysis of Gas Turbines by CFD:Integration of RANS and LES Flow Solvers, (with J.U. Schluter, H. Pitsch, S. Shankaran, J.J. Alonso and P. Moin). ASME Turbo Expo 2003 Land, Sea, and Air, Atlanta, June 2003. GT2003-38350.

Reduction of the Adjoint Gradient Formula in the Continuous Limit, (with A. Jameson). 41st AIAA Aerospace Sciences Meeting & Exhibit, Reno, NV, January 2003. AIAA Paper 2003-0040.

Integration of RANS and LES Flow Solvers for Simultaneous Flow Computations, (with J.U. Schluter, S. Shankaran, H. Pitsch, P. Moin, and J.J. Alonso). 41th AIAA Aerospace Sciences Meeting & Exhibit, Reno, NV, January 2003. AIAA Paper 2003-0085.

Sonic Boom Reduction Using an Adjoint Method for Supersonic Transport Aircraft Configurations, (with S.K. Nadarajah, J.J. Alonso and A. Jameson). IUTAM Symposium Transsonicum IV, Goettingen, Germany, September 2002. Invited Paper.

Optimization of High-Lift Configurations Using a Viscous Adjoint-Based Method, (with J.J. Alonso and A. Jameson). 40th AIAA Aerospace Sciences Meeting & Exhibit, Reno, NV, January 2002. AIAA Paper 2002-0844.

Two-Dimensional High-Lift Aerodynamic Optimization Using the Continuous Adjoint Method, (with J.J. Alonso and A. Jameson). 8th AIAA/USAF/NASA/ISSMO Symposium on Multidisciplinary Analysis and Optimization, Long Beach, CA, September 2000. AIAA Paper 2000-4741.

A Gradient Accuracy Study for the Adjoint-Based Navier-Stokes Design Method, (with J.J. Alonso and A. Jameson). 37th AIAA Aerospace Sciences Meeting & Exhibit, Reno, NV, January 1999. AIAA Paper 99-0299.

Thesis
Design Optimization of High-Lift Configurations Using a Viscous Continuous Adjoint-Based Method. Ph.D. Dissertation, Stanford University, 3781-2001-K, December 2001.

SKILLS

Parallel computation using MPI.
Grid generation using Gridgen. Trained by Pointwise Advanced Training Program.
Programming Languages: FORTRAN, C and Python.
Operating Systems: UNIX, LINUX, Windows, and Mac OS.
Software: Matlab, LaTeX, and various post-processing softwares.
Languages: Native Korean speaker, English, written knowledge of Chinese and Japanese.

INTERESTS & ACTIVITIES

President, Korean Aero & Astro Students Association (KAASA), Stanford University, 1996-1997. Organized cultural, social and academic activities for 40 Stanford members and their family members. Planned and coordinated group travel and sports events. Directed fund raising activities. Intramural tennis, basketball, soccer and golf.

REFERENCES

Prof. Juan J. Alonso
Department of Aeronautics & Astronautics
Stanford University
Stanford, CA 94305
(650) 723-9954

Prof. Antony Jameson
Department of Aeronautics & Astronautics
Stanford University
Stanford, CA 94305
(650) 725-6208