Seongim Choi

CONTACT INFORMATION

Room 211 Building 215
U.S Army Aeroflightdynamics Directorate
Ames Research Center, Moffet field, CA, 94035
Voice: (650) 604-2349

Dept. of Aeronautics and Astronautics
School of Engineering, Stanford University
Durand Building, 496 Lomita Mall
Stanford, CA 94305-4035
Voice: (650) 575-9316
E-mail: sichoi@stanford.edu
Fax: (650) 725-3377

CURRENT AND PAST POSITIONS

Jun. 2007 $\sim$ present	Visiting Researcher in U.S. Army Aeroflightdynamics Directorate
Apr. 2006 $\sim$ present	Research Associate in the Dept. of Aeronautics and Astronautics at Stanford University
Jun. 2001 $\sim$ Jan. 2006	Research Assistant in the Dept. of Aeronautics and Astronautics at Stanford University

RESEARCH INTERESTS

Advanced numerical analysis using CFD, Frequency-based CFD analysis of periodic unsteady flows (Time-Spectral algorithm for URANS solver), Aircraft shape optimization (helicopter rotor and low-boom supersonic jets), Adjoint-based sensitivity analysis & optimization, Genetic Algorithm (GA) based optimization, Response surface techniques, Multi-fidelity and multi-level design optimization, Solution-adaptive unstructured mesh refinement, Geometry kernels with parametric CAD model and robust surface definition.

EDUCATION

Stanford University, Stanford, California, USA

- Ph.D., Jan. 2006, dept. of Aeronautics and Astronautics
  Dissertation Topic: "Multi-fidelity and Multi-disciplinary Design Optimization of Supersonic Business Jets"

Seoul National University, Seoul, Korea

- M.S., March, 1999, dept. of Aerospace Engineering
  Dissertation Topic: "Numerical study on boundary layer separation control of airfoil by local surface buzzing"
- B.S, March 1997, dept. of Aerospace Engineering

QUALIFICATIONS AND EXPERIENCE

Currently working on the U.S. Army sponsored research on design optimization of helicopter rotors using time-spectral and adjoint-based method.

Partially involved in current DoD/DARPA (Department of Defense) Helicopter Quieting Program.

Applied frequency-based, spectral method for the high-fidelity CFD analysis of forward flight of UH-60A Black Hawk helicopter.

Developed state-of-the-art design method for shape optimization of helicopter rotors using time-spectral and adjoint solution method.

Worked on a NASA Langley sponsored research project to develop design optimization methods for reducing the sonic boom of supersonic business jet.

Worked on DARPA Quiet Supersonic Planform project.

Able to use and develop high-fidelity CFD simulations (RANS/EULER) to accurately predict noise and boom propagation from various aircraft and to simulate the flow around rotorcraft configurations.

Developed multi-fidelity analysis tool combining high-fidelity modeling (EULER/RANS) and low-fidelity modeling (Linear Panel Method) to analyze aerodynamic performance and the noise level of supersonic jets.

Developed automated computational design platforms to determine optimum vehicle configuration that reduces sonic boom and drag of supersonic aircraft.

Developed automated unstructured mesh generation procedure by coupling CAD-defined parametric model through geometry kernel CAPRI interface with Centaur mesh generator.

PUBLICATIONS: JOURNALS

Multi-Fidelity Design Optimization of Low-Boom Supersonic Business Jets, (*published in Journal of Aircraft, Vol. 45, No. 1, pp. 106-118, 2008.*)

Two-Level Multi-Fidelity Design Optimization Studies for Supersonic Jets, (*accepted for Journal of Aircraft, will be published in 2009.*)

Numerical and Mesh Resolution Requirements for Accurate Sonic Boom Prediction of Complete Aircraft Configurations, (*accepted for Journal of Aircraft, will be published in 2009.*)

CFD Prediction of Rotor Loads Using Time-Spectral Method and Exact Fluid-Structure Interface, (*submitted to Journal of American Helicopter Society and under review.*)

Propeller Noise:Principles, Analysis and Reduction Methods, J. of Korean Society for Aeronautical and Space Science, Vol.25-2, April, 1998

CONFERENCE PROCEEDINGS

Helicopter Rotor Design Using a Time-Spectral and Adjoint-Based Method, 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Sep. 2008, British Columbia, Canada.

CFD Prediction of Rotor Loads Using Time-Spectral Method and Exact Fluid-Structure Interface, 26th AIAA Applied Aerodynamics Conference, Aug. 2008, Honolulu, Hawaii.

Time-Spectral Method for CFD Prediction of Helicopter Rotor Vibratory Loads, Jul. 2008, Seoul, Korea.

Preliminary Study on Time-Spectral and Adjoint-Based Design Optimization of Helicopter Rotors, AHS Specialist's Conference on Aeromechanics, Jan. 2008, San Francisco, CA.

Validation Study of Aerodynamic Analysis Tools for Design Optimization of Helicopter Rotors, 25th Applied Aerodynamics Conference, Jun. 2007, Miami, FL.

Multi-Fidelity Design of Supersonic Jets Using Surrogate Management Framework Method, 24th Applied Aerodynamics Conference, Jun. 6-9, 2005, Toronto, Canada.

Two-Level Multi-Fidelity Design Optimization Studies for Supersonic Jets, 43rd AIAA Aerospace Sciences Meeting & Exhibition, Jan. 10-13 2005, Reno, NV.

Multi-Fidelity Design Optimization of Low-Boom Supersonic Business Jets, 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Aug. 30–Sep. 1 2004, Albany, NY, (**awarded for Best Paper.**)

Design of a Low-Boom Supersonic Business Jet Using Evolutionary Algorithms and an Adaptive Unstructured Mesh Method, 45th AIAA/ASME/ASCE/AHS/ASC Structures,Structural Dynamics and Materials Conference, April 19-22, 2004, Palm Springs, CA.

Numerical and Mesh Resolution Requirements for Accurate Sonic Boom Prediction of Complete Aircraft Configurations, 42nd AIAA Aerospace Sciences Meeting & Exhibit, Jan. 5-8, 2004, Reno, NV, *Invited to Royal Aerodynamical Society Aerodynamics Conference for AIAA/RAes Best Paper Swap. Sep. 14-16, London, (***awarded one of the Best Papers in Aerodynamics**)

Supersonic Business Jet Design Using Knowledge-Based Genetic Algorithm with Adaptive, Unstructured Grid Methodology, 21st AIAA Applied Aerodynamics Conference, Jun. 23-26, 2003, Orlando, FL.

AWARDS

- Best Paper Award, 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization, Sep 2004.
- One of the Best Papers in Applied Aerodynamics, 45th AIAA/ASME Aerospace Sciences Meeting & Exhibition, Jan 2004, invited for best paper swap in RaSoc, Sep 2004.
- Ambassadorial Scholarship from Rotary Foundation (2000-2001)

COMPUTER LITERACY

- Comfortable with Unix, Linux , Windows and OS-X
- Proficient in C++, C, F90 and F77 and possess working knowledge of python
- Proficient in CAD software (pro/Engineer, AUTOCAD)
- Working knowledge of unstructured/structured grid generation software (GridGen and Centaur), post-processing tools (Plot3d, Tecplot, PV3 and FieldView) and commercial Finite Element packages (NASTRAN and CAFEM)
- Developed parallel programs for linux clusters, SGI Origin 2000 and IBM SP2 using MPI
- Prepared documents in Latex, Microsoft Word and presentations in Microsoft Power-Point

REFERENCES

- Prof. Juan J. Alonso, Department of Aeronautics and Astronautics, Stanford University, Stanford, CA 94305
- Prof. Ilan Kroo, Department of Aeronautics and Astronautics, Stanford University, Stanford, CA 94305
- Prof. Martins, Joaquim R. R. A., Department of Aerospace Engineering University of Toronto, Toronto, Canada
- Prof. Antony Jameson, Department of Aeronautics and Astronautics, Stanford University, Stanford, CA 94305
- Mark Potsdam, U.S. Army Aeroflightdynamics Directorate, Ames Research Center, Moffett field, CA 94040