

# MYONG, RHO SHIN

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## POSITION

Professor (Head), Department of Aerospace and Software Engineering, Gyeongsang National University, South Korea.  
Director, (Engineering) Research Center for Aircraft Core Technology (ACTRC), Gyeongsang National University, South Korea.

## EDUCATION

Ph.D. Aerospace Engineering, Aug. 1996, University of Michigan, Ann Arbor, U.S.  
Thesis: Theoretical and computational investigations of nonlinear waves in magnetohydrodynamics.  
Advisor: Professor P. L. Roe.  
M.S. Aeronautical Engineering, Feb. 1989, Seoul National University, South Korea.  
B.S. Aeronautical Engineering, Feb. 1987, Seoul National University, South Korea.

## ACADEMIC AND RESEARCH EXPERIENCES

Professor (1999.3-date), Dept. of Aerospace and Software Engineering, Gyeongsang National University, South Korea.  
Director (2017.6-date), (Engineering) Research Center for Aircraft Core Technology (ACTRC), Gyeongsang National University, South Korea.  
Guest Professor (2014.6-2019.4), Northwestern Polytechnical University, Xian, China.  
Visiting Professor (2004.7-2005.2), Advanced Simulation and Computing (ASC) FLASH Center, University of Chicago, U.S.  
Visiting Scholar (2004.1-6), Dept. of Mechanical Engineering, University of Strathclyde, U.K.  
Visiting Scholar (2000.1-2, 6-7), Institute for Mathematics and its Applications (IMA), University of Minnesota, U.S.  
National Research Council Research Associate (1997.2-1999.2), Space Data and Computing Division, NASA Goddard Space Flight Center (GSFC), U.S.

## HONORS AND AWARDS

University Research and Leadership Award, Gyeongsang National University, South Korea, 2013 & 2017.

Associate Fellow, American Institute of Aeronautics and Astronautics (AIAA), 2014.

## **JOURNAL EDITORIAL BOARD AND SCIENTIFIC/TECHNICAL/ORGANIZING COMMITTEE MEMBERSHIP**

Editorial Board, *International Journal of Computational Fluid Dynamics*, Taylor & Francis (UK), 2009.6 – date.

Associate Editor, *Advances in Aerodynamics*, China Aerodynamics Research and Development Center (China), 2018.1 – date.

Associate Editor, *Journal of Aerospace Technology and Management*, Instituto de Aeronáutica e Espaço (Brazil), 2017.9 – date.

Associate Editor, *Communications in Computational Physics*, Cambridge University Press (UK), 2010.1 – 2016.12.

Organizing Committee Chairman, *32<sup>nd</sup> International Symposium on Rarefied Gas Dynamics*, Seoul, South Korea, 2018-2020.

International Scientific Board, *International Conference on Mathematical Modeling in Physical Sciences*, 2012.3 – date.

International Scientific Committee, *Micro and Nano Flows Conference*, 2009.9 – date.

Organizing Committee Vice-Chair, *10th National Congress on Fluids Engineering (Two Decades of Fluid Dynamics: Classic, Emerging, and Fourth Revolution)*, South Korea, 2018.

## **RESEARCH INTERESTS**

Rarefied and micro-scale gas dynamics for aerospace and mechanical applications

Theoretical and computational magnetohydrodynamics (MHD) for space plasmas and propulsion

Applied aerodynamics and aircraft/wind-turbine icing/lightning

Aircraft survivability and computational electromagnetics

## **RECENT SELECTED JOURNAL PUBLICATIONS**

Myong, R. S., Karchani, A., Ejtehadi, O., “A review and perspective on a convergence analysis of the direct simulation Monte Carlo and solution verification,” *Physics of Fluids*, Vol. 21, 31, 066101, 2019.

Prince Raj, L., Lee, L. W., Myong, R. S., “Ice accretion and aerodynamic effects on a multi-element airfoil under SLD icing condition,” *Aerospace Science and Technology*, Vol. 85, pp. 320-333, 2019.

Ejtehadi, O., Rahimi, A., Karchani, A., Myong, R. S., “Complex wave patterns in dilute gas-particle flows based on a novel discontinuous Galerkin scheme,” *International Journal of Multiphase Flow*, Vol. 104, pp. 125-151, 2018.

Singh, S., Karchani, A., Myong, R. S., “Non-equilibrium effects of diatomic and polyatomic gases on the shock-vortex interaction based on the second-order constitutive model of the Boltzmann-Curtiss equation,” *Physics of Fluids*, Vol. 30, No. 1, 016109, 2018.

Raj, L. P., Singh, S., Karchani, A., Myong, R. S., “A super-parallel mixed explicit discontinuous Galerkin method for the second-order Boltzmann-based constitutive models of rarefied and microscale gases,” *Computers & Fluids*, Vol. 157, pp. 146-163, 2017.

Rana, A., Ravichandran, R., Park, J. H., Myong, R. S., “Microscopic molecular dynamics characterization of the second-order non-Navier-Fourier constitutive laws in the Poiseuille gas flow,” *Physics of Fluids*, Vol. 28, No. 8, 082003, 2016.

- Myong, R. S., “Theoretical description of the gaseous Knudsen layer in Couette flow based on the second-order constitutive and slip-jump models,” *Physics of Fluids*, Vol. 28, No. 1, 012002, 2016.
- Myong, R. S., “On the high Mach number shock structure singularity caused by overreach of Maxwellian molecules,” *Physics of Fluids*, Vol. 26, No. 5, 056102, 2014.
- Le, N. T. P., Xiao, H., Myong, R. S., “A triangular discontinuous Galerkin method for non-Newtonian implicit constitutive models of rarefied and microscale gases,” *Journal of Computational Physics*, Vol. 273, pp. 160-184, 2014.

## MAJOR INVITED TALKS/LECTURES

- “Aerodynamic and propulsive effects of in-flight icing on fixed-wing aircraft and rotorcraft,” *Plenary Lecture in 8th Symposium on Applied Aerodynamics and Design of Aerospace Vehicles (SAROD)*, India (Bangalore), 2018.
- “IR aspect of aircraft propulsion system and IR-RF interplay in design,” *Invited Presentation in Pre-SAROD Workshop on Stealth in Aerospace Design, 8th Symposium on Applied Aerodynamics and Design of Aerospace Vehicles (SAROD)*, India (Bangalore), 2018.
- “Physics of polyatomic gases in non-equilibrium based on the second-order Boltzmann-type kinetic theory,” *Invited Presentation in 31st International Rarefied Gas Dynamics Symposium*, UK (Glasgow), 2018.
- “Complexity out of simplicity in Boltzmann equation and decomposed computation,” *Invited Presentation in Cambridge Workshop for Phil Roe’s 80th Birthday*, UK (Cambridge), 2018.
- “Rarefied & microscale gases and viscoelastic fluids: a unified framework,” *Invited 15 Lectures in Global Initiative Academic Networks (GIAN) Course*, India (IIT-Kanpur), Feb 23 - Mar 03, 2017.  
[https://www.youtube.com/watch?v=uxO6p5rwnVU&list=PL48UwQJyfW3SH87fOJPIHetkHh\\_vT0cOBa](https://www.youtube.com/watch?v=uxO6p5rwnVU&list=PL48UwQJyfW3SH87fOJPIHetkHh_vT0cOBa)
- “A review of Boltzmann-based CFD schemes,” *Keynote Lecture in 18th International Conference on Finite Elements in Flow Problems*, Taiwan, 2015.
- “What makes gas micro flows so complicated: non-classical physical laws and their morphing into gas-surface interaction,” *Keynote Lecture in 1st European Conference on Gas Micro Flows*, Greece, 2012.

## RECENT PH.D. GRADUATES

- Ejtehadi, Omid, “A novel continuum-based approach for simulation of dusty gas flows in non-equilibrium using a discontinuous Galerkin method,” *Ph.D. Dissertation*, Gyeongsang National University, 2018.8. (Now at Korea Institute of Science and Technology Information, South Korea)
- Singh, Satyvir, “Development of a 3D discontinuous Galerkin method for the second-order Boltzmann-Curtiss based hydrodynamic models of diatomic and polyatomic gases,” *Ph.D. Dissertation*, Gyeongsang National University, 2018.2. (Now at Nanyang Technological University, Singapore)
- Raj, Prince, “High-fidelity computational modeling of in-flight ice accretion on aircraft and rotorcraft including super-cooled large droplet,” *Ph.D. Dissertation*, Gyeongsang National University, 2017.8. (Now at Research Center for Aircraft Core Technology, Gyeongsang National University, South Korea)
- Karchani, Abolfazl, “Discontinuous Galerkin methods for the second-order Boltzmann-based hydrodynamic models,” *Ph.D. Dissertation*, Gyeongsang National University, 2017.2. (Now at ANSYS FLUENT, US)