

Dr Konstantinos RITOS CEng MIMechE FIES

PERSONAL DATA

PLACE AND DATE OF BIRTH: Thessaloniki, Greece | 06 October 1986
NATIONALITY: Hellenic and British
PHONE: +30 24210 74003
EMAIL: konritos@uth.gr
LINKEDIN: <http://www.linkedin.com/pub/konstantinos-ritos/48/34/aba>

ACADEMIC QUALIFICATIONS

2011–2014 | **PhD** in MECHANICAL & AEROSPACE ENGINEERING, **University of Strathclyde**, Glasgow, UK
Field of study: “Nano and Micro-Scale Fluid Dynamics”
Supervisors: Prof. Jason M. REESE and Prof. Yonghao ZHANG

2004–2009 | **Diploma (MEng)** in MECHANICAL ENGINEERING, **University of Thessaly**, Volos, Greece
GRADE: 8.42 out of 10 (*First in Class*)

WORK EXPERIENCE

Oct 2021- to date | **University of Thessaly**, Volos, Greece
• Assistant Professor in Compressible Flows - Turbomachinery, *Department of Mechanical Engineering*

Jun 2012 - Sep 2021 | **University of Strathclyde**, Glasgow, UK
• Lecturer, *Department of Mechanical & Aerospace Engineering* (Nov 2015 - Sep 2021)
• Research Associate, *Weir Advanced Research Centre* (Oct 2014 - Nov 2015)
• Research Assistant, *James Weir Fluids Laboratory* (Jun 2012 - Aug 2012)

Aug 2009-Dec 2010 | **ETH**, Zurich, Switzerland
• Research Assistant, *Computational Science and Engineering Lab*

Jul 2005-May 2009 | **University of Thessaly**, Volos, Greece
• Research Assistant, *Laboratory of Transport Processes and Process Equipment* (Jul 2006 - May 2009)
• Research Assistant, *Laboratory of Thermodynamic and Thermal Engines* (Mar 2008 - Jun 2008)
• Internship in the **GENERAL CHEMICAL STATE LABORATORY**, Thessaloniki, Greece (Jul 2005 - Aug 2005)

RESEARCH & TEACHING EXPERIENCE

RESEARCH

Carry out research in the fields of:

- Multi-physics modelling of advanced fluid mechanics applications using a range of programming languages (Fortran 90/95, C/C++, Python, Perl, Matlab) as well as commercial CFD tools such as OpenFOAM, Fluent and Star-CCM+.
- High-order methods accuracy assessment in supersonic and hypersonic transitional and turbulent boundary layers, including problems featuring shock wave/boundary layer interaction (SWBLI) and separation, with an overall scope to improve understanding of acoustic loading on aerospace structures. Research sponsored by the Air Force Office of Scientific Research, Air Force Material Command, USAF.
- CFD-DEM modeling of flows within centrifugal pumps, with a specific focus on the development and assessment of computational tools to improve the design of pumps and valves for use with slurry based fluid mixtures.
- Multi-phase and multi-scale study of immersion quenching and heat transfer with phase change across the length scales, from nano to macro. Development and use of various computational tools involving Molecular Dynamics,

Coarse Grained Molecular Dynamics, conventional CFD and Machine Learning techniques to minimise empiricism in the field.

- Advanced nanomaterials manufacturing: fluid flow assisted control of nucleation and self-assembly processes. Brownian dynamics C++ code development.
- Modelling of fluid flows inside and around micro and nano structures, using multiscale techniques. Development of a molecular dynamics C++ code which constituted as part of a multiscale solver.
- Graphics Processing Unit (GPU) based solver, in order to accelerate Molecular Dynamics simulations.
- Molecular Dynamics study of flows through carbon nanotube membranes.
- Flows through microchannels of various cross sections due to pressure and temperature gradient.

Other research activities:

- Principal Investigator of the Knowledge Exchange project “DEM pump studies - IAA CFD-DEM modelling of Slurry Pumps”.
- Co-Investigator of the Knowledge Exchange project “WARC 2 DEM feasibility studies”.
- Supervisor of PhD project on numerical simulations of heat transfer in quenching applications, external aerodynamics and induced drag reduction as .
- Supervisor of PhD project on the numerical and analytical study of induced drag
- Co-Supervisor of PhD project on perfusion optimisation for design of vascular grafts used in the treatment of aortic disease.
- Co-Supervisor of PhD project on Physics informed machine learning for quenching.

TEACHING TOPICS

Lecturer	“Desing of Thermal Systems”, a Fourth Year elective Course “ME301: Heat and Flow 3, Fluid Mechanics”, a Third Year compulsory Course with more than 240 students “ME514 Advanced Topics in Fluid Systems Engineering”, a Fifth Year Master’s level Course with more than 60 students “EO103 Mechanical Engineering Principles” “EO406: Energy Fundamentals & Applications”
Tutor	“16429: Computer Aided Engineering Design” “ME301: Heat and Flow 3, Fluid Mechanics” “ME301: Heat and Flow 3, Thermodynamics” “Numerical Methods for Partial Differential Equations” “Computer Science for Mathematicians and Physicists”

LANGUAGES

ENGLISH, GREEK: Fluent
FRENCH: Advanced

PROFESSIONAL MEMBERSHIPS

- Chartered Engineer, Member of the Institution of Mechanical Engineers (IMechE)
- Member of American Society of Mechanical Engineers (ASME)
- Member of American Institute of Aeronautics and Astronautics (AIAA)
- Member of American Physical Society (APS)
- Fellow of the Defence and Security Research Institute (DSRI) of the University of Nicosia
- Fellow of the Institution of Engineers in Scotland (IES)

- 1) D. Drikakis, **K. Ritos**, S. M. Spottswood, and Z. B. Riley “Flow transition to turbulence and induced acoustics at Mach 6”, *Physics of Fluids*, Volume 33, Number 7, 2021
- 2) R. Kamencky, M. Frank, D. Drikakis, and **K. Ritos** “A Study of Nucleate Boiling Conjugate Heat Transfer”, *Advances in Heat Transfer and Thermal Engineering*, 203 - 206, 2021
- 3) S. Black, **K. Ritos**, C. Maclean, R. Brodie, and A. Kazakidi “P14 Blood flow analysis of the aortic arch using computational fluid dynamics in a coupled 3D-0D framework”, *Heart Journal*, Volume 106, 2020
- 4) I. W. Kokkinakis, D. Drikakis, **K. Ritos**, and S. M. Spottswood, “Direct Numerical Simulation of Supersonic Flow and Acoustics over a Compression Ramp”, *Physics of Fluids*, Volume 32, Number 6, 2020
- 5) **K. Ritos**, D. Drikakis, I. W. Kokkinakis, and S. M. Spottswood, “Computational Aeroacoustics beneath High Speed Transitional and Turbulent Boundary Layers”, *Computers & Fluids*, Volume 203, 2020
- 6) **K. Ritos**, I. W. Kokkinakis, and D. Drikakis, “Wall-pressure spectra models for supersonic and hypersonic turbulent boundary layers”, *Journal of Sound & Vibration*, Volume 443, 90 - 108, DOI: [10.1016/j.jsv.2018.11.001](https://doi.org/10.1016/j.jsv.2018.11.001), 2019
- 7) **K. Ritos**, I. W. Kokkinakis, and D. Drikakis, “Acoustic loading beneath hypersonic transitional and turbulent boundary layers”, *Journal of Sound & Vibration*, Volume 441, 50 - 62, DOI: [10.1016/j.jsv.2018.10.021](https://doi.org/10.1016/j.jsv.2018.10.021), 2019
- 8) M. K. Borg, D. A. Lockerby, **K. Ritos**, and J. M. Reese, “Multiscale simulation of water flow through laboratory-scale nanotube membranes”, *Journal of Membrane Science*, Volume 567, 115 - 126, 2018
- 9) **K. Ritos**, I. W. Kokkinakis, D. Drikakis, “Performance of high-order implicit Large Eddy Simulations”, *Computer & Fluids*, DOI: [10.1016/j.compfluid.2018.01.030](https://doi.org/10.1016/j.compfluid.2018.01.030), 2018
- 10) **K. Ritos**, I. W. Kokkinakis, D. Drikakis, “Physical insight into the accuracy of finely-resolved iLES in turbulent boundary layers”, *Computer & Fluids*, DOI: [10.1016/j.compfluid.2017.07.018](https://doi.org/10.1016/j.compfluid.2017.07.018), 2017
- 11) **K. Ritos**, I. W. Kokkinakis, D. Drikakis, S. M. Spottswood, “Implicit large eddy simulation of acoustic loading in supersonic turbulent boundary layers”, *Physics of Fluids*, Volume 29, 046101, DOI: [10.1063/1.4979965](https://doi.org/10.1063/1.4979965), 2017
- 12) J. Zhang, M. K. Borg, **K. Ritos**, J. M. Reese, “Electrowetting Controls the Deposit Patterns of Evaporated Salt Water Nanodroplets”, *Langmuir*, Volume 32, Number 6, 1542 - 1549, DOI: [10.1021/acs.langmuir.5b04424](https://doi.org/10.1021/acs.langmuir.5b04424), 2016
- 13) **K. Ritos**, M. K. Borg, N. J. Mottram, J. M. Reese, “Electric fields can control the transport of water in carbon nanotubes”, *Philosophical Transactions of the Royal Society A*, Volume 374, 20150025, DOI: [10.1098/rsta.2015.0025](https://doi.org/10.1098/rsta.2015.0025), 2016
- 14) A. A. Anastasi, **K. Ritos**, G. Cassar, M. K. Borg, “Mechanical properties of pristine and nanoporous graphene”, *Molecular Simulation*, DOI: [0.1080/08927022.2016.1209753](https://doi.org/10.1080/08927022.2016.1209753), 2016
- 15) **K. Ritos**, M. K. Borg, D. A. Lockerby, D. R. Emerson, J. M. Reese, “Hybrid molecular-continuum simulations of water flow through carbon nanotube membranes of realistic thickness”, *Microfluidics and Nanofluidics*, DOI: [10.1007/s10404-015-1617-x](https://doi.org/10.1007/s10404-015-1617-x), 2015
- 16) **K. Ritos**, D. Mattia, F. Calabrò, J. M. Reese, “Flow enhancement in nanotubes of different materials and lengths”, *The Journal of Chemical Physics*, Volume 140, 014702, 2014
- 17) **K. Ritos**, N. Dongari, M. K. Borg, Y. Zhang, J. M. Reese, “The dynamics of nanoscale droplets on moving surfaces”, *Langmuir*, Volume 29, 6936 - 6943, 2013
- 18) J. H. Walther, **K. Ritos**, E. R. Cruz-Chu, C. M. Megaridis, P. Koumoutsakos, “Barriers to Superfast Water Transport in Carbon Nanotube Membrane”, *NANO LETTERS*, Volume 13, Number 5, 1910 - 1914, 2013
- 19) **K. Ritos**, Y. Lihnaropoulos, S. Naris, D. Valougeorgis, “Pressure and Temperature Driven Flow through Triangular and Trapezoidal Microchannels”, *Heat Transfer Engineering*, Volume 32, Number 13-14, 1101 - 1107, 2011

CONFERENCES

- 1) R. Kamenicky, M. Frank, D. Drikakis, **K. Ritos**, “Wall Boiling Theory and Practice for Immersion Quenching”, 33rd Scottish Fluid Mechanics Meeting, Edinburgh (Online), UK, May 2020
- 2) S. Black, **K. Ritos**, C. Maclean, R. Brodie, A. Kazakidi, “Effect of Windkessel Boundary Conditions on 3D Blood Flow Simulations in the Aortic Arch”, 33rd Scottish Fluid Mechanics Meeting, Edinburgh (Online), UK, May 2020

- 3) S. Black, K. Ritos, C. Maclean, R. Brodie, A. Kazakidi, "Blood flow analysis of the aortic arch using computational fluid dynamics in a coupled 3D-0D framework", 23rd Annual Meeting Scottish Cardiovascular Forum, Glasgow, UK, February 2020
- 4) S. Black, K. Ritos, C. Maclean, R. Brodie, A. Kazakidi, "Perfusion optimisation for design of vascular grafts used in the treatment of aortic disease", CMALS One Health Workshop , Glasgow, UK, December 2019
- 5) R. Kamenicky, M. Frank, D. Drikakis, K. Ritos, "Heat Transfer Partitioning models for nucleate boiling", 16th UK Heat Transfer Conference, Nottingham, UK, September, 2019
- 6) S. Black, K. Ritos, C. Maclean, R. Brodie, A. Kazakidi, "Perfusion optimisation for vascular grafts design used in the treatment of aortic disease", Terumo Aortic Academic Collaborations Conference, Glasgow, UK, September 2019
- 7) R. Kamenicky, M. Frank, D. Drikakis, K. Ritos, "Heat Transfer Partitioning models for nucleate boiling", CMP4 – ECCOMAS, Porto, Portugal, July, 2019
- 8) K. Ritos, C. Roddick, I. W. Kokkinakis, "Investigation of aerodynamic loading on a train pantograph", 8th Before Reality Conference, Munich, Germany, May 2019
- 9) K. Ritos, D. Drikakis, I. W. Kokkinakis, "Computational aeroacoustics beneath high speed transitional and turbulent boundary layers", 10th International Conference on Computational Fluid Dynamics, Barcelona, Spain, July 2018
- 10) K. Ritos, D. Drikakis, I. W. Kokkinakis, "Simulation of multi-mode transition to turbulence in compressible boundary layers using high-order methods", 7th European Conference on Computational Fluid Dynamics, Glasgow, UK, June 2018
- 11) K. Ritos, I. W. Kokkinakis, D. Drikakis, "Physical insight into a Mach 7.2 compression corner flow", 56th AIAA Aerospace Sciences Meeting, Kissimmee, USA, January 2018
- 12) D. Drikakis, K. Ritos, "Acoustic loading in transitional & turbulent hypersonic boundary layers", 1st International Aerospace Symposium on Acoustic Fatigue, Glasgow, UK, September 2017
- 13) K. Ritos, D. Drikakis, I. W. Kokkinakis, "Under-resolved DNS of turbulent boundary layers in hypersonic flows", UKTC Annual Meeting, London, UK, September 2017
- 14) D. Drikakis, K. Ritos, M. Frank, I. W. Kokkinakis, "The role of computational science and engineering in condition monitoring", First World Congress on Condition Monitoring, London, UK, June 2017
- 15) K. Ritos, I. W. Kokkinakis, D. Drikakis, "Balancing Accuracy Requirements and Computational Cost in Implicit LES and DNS.", 29th International Conference on Parallel Computational Fluid Dynamics, Glasgow, UK, May 2017
- 16) K. Ritos, I. W. Kokkinakis, D. Drikakis, "Thermo-Acoustic Effects in High-Speed Compressible Transitional and Turbulent Boundary Layers", 55th AIAA Aerospace Sciences Meeting, Grapevine, USA, January 2017
- 17) D. Drikakis, K. Ritos, "Large Eddy Simulation of Supersonic and Hypersonic Turbulent Boundary Layers", International Workshop on Recent Advances in Numerical Methods for Hyperbolic Conservation Laws and Non-linear Time Dependent Partial Differential Equations, Trento, Italy, November 2016
- 18) A. A. Anwar, K. Ritos, Y. Gorash, W. Dempster, D. Nash, 'Microflow leakage through the clearance of a metal-metal seal', ASME Pressure Vessels & Piping Conference, Vancouver, Canada, July 2016
- 19) A. Mackenzie, A. Lopez, K. Ritos, M. T. Stickland, W. M. Dempster, "A comparison of CFD software packages' ability to model a submerged jet", 11th International Conference on CFD in the Minerals and Process Industries, Melbourne, Australia, December 2015
- 20) J. Reese, K. Ritos, M. Borg, D. Lockerby, "Hybrid molecular-continuum techniques for micro and nano flows", 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston, USA, November 2015
- 21) K. Ritos, M. K. Borg, D.A. Lockerby, D. R. Emerson, J. M. Reese, "Molecular-continuum simulations of water filtration through aligned carbon nanotube membranes", 2nd International Conference on Desalination using Membrane Technology, Singapore, July 2015
- 22) D.A. Lockerby, A. Patronis, D. Stephenson, D.M. Holland, M. K. Borg, K. Ritos, J. M. Reese, "Multiscale modelling of micro/nano flows", 4th European Conference on Microfluidics, Limerick, Ireland, December 2014

- 23) D.A. Lockerby, A. Patronis, D. Stephenson, D.M. Holland, M. K. Borg, K. Ritos, J. M. Reese, "Multiscale modelling of micro/nano flows", CECAM Workshop on Multiscale Simulation Methods for Soft Matter Systems, Mainz, Germany, October 2014
- 24) M. K. Borg, K. Ritos, D. Stephenson, D.A. Lockerby, J. M. Reese, "A coupled continuum-molecular method for simulating isothermal flows in nano-scale networks", 10th International Conference on Heat Transfer, Fluid Mechanics & Thermodynamics, Orlando, USA, July 2014
- 25) K. Ritos, Invited talk at the Department of Mechanical Engineering, University of Thessaly, Greece, April 2014
- 26) K. Ritos, M. K. Borg, J. M. Reese, Invited talks at the University of Illinois at Chicago and Carnegie Mellon University at Pittsburgh, USA, November 2013
- 27) K. Ritos, M. K. Borg, D.A. Lockerby, S. Ivekovic, Y. Zhang, J. M. Reese, "Towards realistic multiscale molecular-continuum modelling of water flow through nanotube membranes", 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, USA, November 2013
- 28) J. M. Reese, M. K. Borg, N. Dongari, K. Ritos, "Molecular flow engineering", International Conference on Non-linear Dynamics in Engineering, Modelling, Analysis & Applications, Aberdeen, UK, August 2013
- 29) K. Ritos, Y. Zhang, J. M. Reese, M. S. N Oliveira, "Computational study of the effect of shear flow on nanoparticle nucleation", Directed Assembly of Functional Nanomaterials: Design, Control and Manufacture conference, Glasgow, UK, June 2013
- 30) K. Ritos, M. K. Borg, D.A. Lockerby, Y. Zhang, J. M. Reese, "Nanotube Water Filtration Membranes: A hybrid simulation approach", 26th Scottish Fluid Mechanics Meeting, Aberdeen, UK, May 2013
- 31) K. Ritos, M. K. Borg, S. Ivekovic, D.A. Lockerby, J. M. Reese, "Simulating flow in aligned nanotube membranes using molecular dynamics", 1st International Conference on Desalination Using Membrane Technology, Sitges, Spain, April 2013
- 32) K. Ritos, N. Dongari, Y. Zhang, J. M. Reese, "Dynamic wetting on moving surfaces: A molecular dynamics study", 10th International Conference on Nanochannels, Microchannels, and Minichannels, Puerto Rico, USA, July 2012
- 33) G. Babac, K. Ritos, J. M. Reese, "Molecular dynamics simulations of mass transfer due to a temperature gradient", International Symposium on Advances in Computational Heat Transfer, Bath, UK, July 2012
- 34) K. Ritos, N. Dongari, Y. Zhang, J. M. Reese, "Dynamic wetting on moving surfaces: A molecular dynamics study", 5th Scottish Fluid Mechanics Meeting, Edinburgh, UK, May 2012
- 35) K. Ritos, M. Borg, J. Reese, "From hydrophobic to super-hydrophobic behaviour: A multiphase molecular dynamics study of water on nano-rough surfaces", summer school for Fast Methods for Long-Range Interactions in Complex Systems, Juelich, Germany, September 2011
- 36) K. Ritos, E.M. Kotsalis, J. H. Walther, Y. Ding, M. Praprotnik, P. Koumoutsakos, "Multiscale flow simulation of water past a C₅₄₀ Fullerene", 3rd International NanoBio Conference, Zurich, Switzerland, September 2010
- 37) D. Valougeorgis, K. Ritos, "Study of the thermomolecular pressure difference phenomenon in thermal creep flows through microchannels of triangular and trapezoidal cross section", 2nd Micro and Nano Flows Conference, MNF2009, London, UK, September 2009