PARALLEL CFD 2019

May 14-17, 2019, Antalya TURKEY

PROGRAM BOOK

Program Overview

May 14, 2019, Tuesday

08.30-09.00	Opening Ceremony	Ballroom A
09.00-10.00	Invited Speaker: **Aimee Morgans**	Ballroom A
10.00-10.30	Coffee Break	Foyer
10.30-12.10	Session: Parallel Algorithms/Solvers - I Session: Mechanical/Aerospace Engineering Applications - I Session: Optimization	Ballroom A Ballroom B Ballroom C
12.10-13.30	Lunch Break	
13.30-14.30	Invited Speaker: **Ayse Güngör**	Ballroom A
14.30-15.00	Coffee Break	Foyer
15.00-16.40	Session: Parallel Software Development Session: Industrial/Environmental Engineering Applications	Ballroom A Ballroom B
18.00-21.00	Welcome Cocktail	

May 15, 2019, Wednesday

09.00-10.00	Invited Speaker: **Murat Manguoğlu**	Ballroom A
10.00-10.30	Coffee Break	Foyer
10.30-12.10	Session: Parallel Algorithms/Solvers - II Session: Mechanical/Aerospace Engineering Applications - II Session: Multi-Scale/Multi-Physics Applications	Ballroom A Ballroom B Ballroom C
12.10-13.30	Lunch Break	
13.30-14.30	Invited Speaker: **David Emerson**	Ballroom A
14.30-15.00	Coffee Break	Foyer
15.00-16.40	Session: Parallel Algorithms/Solvers - III Session: Turbulence/Aeroacoustics	Ballroom A Ballroom B
19.30-22.30	Banquet Dinner	

May 16, 2019, Thursday

09.00-10.00	Invited Speaker: **Xiaowen Shan**	Ballroom A
10.00-10.30	Coffee Break	Foyer
10.30-12.10	Session: Parallel Algorithms/Solvers - IV Session: Mechanical/Aerospace Engineering Applications - III	Ballroom A Ballroom B
12.10-13.00	Lunch Break	
13.30-22.00	Excursion to Termessos and Fish Dinner at Duden	

PARALLEL CFD 2019

May 14-17, 2019, Antalya TURKEY

May 14, 2019, Tuesday

09.00-10.00	**INVITED SPEAKER** Chair: Hasan U. Akay	**Ballroom A**
	THE AERODYNAMICS OF SIMPLIFIED VEHICLES: SIMULATING WAKE BI-MODALITY	**Aimee Morgans**
10.00-10.30	**Coffee Break**	
10.30-12.10	**Parallel Algorithms/Solvers - I** Chair: Aimee Morgans	**Ballroom A**
10.30	FULLY IMPLICIT NAVIER-STOKES CODE IN VELOCITY - VORTICITY FORMULATION	Damien Tromeur-Dervout
10.50	AUTOMATIC UNSTRUCTURED MESH GENERATION ALGORITHM WITH MULTI-LEVEL PARALLELISM	Xiang Gao, Dali Li and Chuanfu Xu
11.10	A MPI-CUDA PARALLEL SOLVER FOR 3D FLOWS ON UNSTRUCTURED FINITE VOLUME MESHES	Miguel Uh Zapata and Francisco J. Hernández-lópez
11.30	LOAD BALANCE ALGORITHM RESEARCH ON PARALLEL PARTITIONED MULTI-BLOCK STRUCTURED OVERLAPPING GRID	Wang Wen, Jiang Huabing and Li Chunli
11.50	A BLOCK BASED PRECONDITIONER FOR FLUID-STRUCTURE INTERACTION PROBLEMS	Ayse Cetin and Mehmet Sahin

May 14, 2019, Tuesday

10.30-12.10 **Mechanical/Aerospace Engineering Applications - I** — **Ballroom B**
Chair: Metin Muradoglu

10.30	NUMERCAL SIMULATION OF FLOWS USING A BLENDED IDDES AND CORRELATION BASED TRANSITION MODEL	Ho Jun Kim, Sang Hyun Park and Oh Joon Kwon
10.50	NUMERICAL SIMULATION OF LIQUID APOGEE ENGINE PLUME FOR GEO SATELLITE USING PARALLEL DSMC METHOD	Kyun Ho Lee
11.10	LARGE EDDY SIMULATION OF TIP LEAKAGE FLOW IN A LINEAR TURBINE CASCADE	Abdurrahman Gazi Yavuz and Ayse Gul Gungor
11.30	STUDY OF BUBBLE COALESCENCE IN MICROFLUIDICS USING GPU ACCELERATED LATTICE BOLTZMANN METHOD	Huidan(whitney) Yu and Rou Chen
11.50	WIND FIELD SIMULATION IN A WIND FARM USING OPENFOAM AND ACTUATOR LINE MODEL	Huseyin Can Onel and Ismail H. Tuncer

10.30-12.10 **Optimization** — **Ballroom C**
Chair: Whitney Yu

10.30	A PARALLEL AEROSTRUCTURAL SHAPE OPTIMIZATION PLATFORM FOR AIRPLANE WINGS	Erdal Oktay, Anıl Arpaci, Onur T. Şehitoglu and Hasan U. Akay
10.50	STABILITY OF INDUSTRIAL AERODYNAMIC DESIGN OF WIDE-BODY-WING CONFIGURATION TO ITS INITIAL SHAPE	S.V.Peigin, S.V.Timchenko and S.A.Orlov
11.10	BEZIER CURVE-BASED S-SHAPE OPTIMIZATION FOR RAE-M2129 INLET	Mete Atasoy, Erdem Dincer and Tezcan Unlu
11.30	OPTIMIZATION OF DIVERGING SECTION OF PUTNAM NOZZLE AT DIFFERENT CONICAL ANGLE	Mete Atasoy, Mehmet A. Eldemir and Tezcan Unlu
11.50	NOZZLE OPTIMIZATION USING ADJOINT-BASED OPTIMIZATION TOOL SU2	Berkan Yerlikaya, Engin Leblebici, Levent Ünlüsoy and Ismail H. Tuncer

PARALLEL CFD 2019

May 14-17, 2019, Antalya TURKEY

May 14, 2019, Tuesday

12.10-13.30 **Lunch Break**

13.30-14.30 **INVITED SPEAKER** — **Ballroom A**

Chair: Hasan U. Akay

TACKLING TURBULENCE WITH HIGH PERFORMANCE COMPUTING — **Ayse Güngör**

14.30-15.00 **Coffee Break**

15.00-16.40 **Parallel Software Development** — **Ballroom A**

Chair: Damien Tromeur-Dervout

15.00	PARALLELIZATION OF AN UNSTRUCTURED MESH FLUID APPLICATION WITH BLACK-BOX SOLVERS	Chen Jun
15.20	DEVELOPING A DOMAIN-SPECIFIC LANGUAGE FOR LATTICE BOLTZMANN MODELLING	Jianping Meng, Lokesh K. Ragta, Xiao-jun Gu and David R. Emerson
15.40	PYLBMFLOW: A FULLY PYTHON-ENABLED LARGE-SCALE HIGH- PERFORMANCE 3D LATTICE BOLTZMANN MULTI-PHASE FLOW SOLVER	Chuanfu Xu, Yonggang Che and Zhenghua Wang
16.00	A PURE VIRTUAL APPROACH FOR MANAGING PLATFORM PORTABILITY ON HYBRID SUPERCOMPUTERS	Xavier Álvarez-farré, Andrey Gorobets, Àdel Alsati and F. Xavier Trias
16.20	A NEW PARALLEL SCIENTIFIC COMPUTING PLATFORM: RIGOROUS ADVANCED PLASMA INTEGRATION TESTBED (RAPIT)	Y.-m. Lee, M.-h. Hu, K.-I. Chen and J.-s. Wu

May 14, 2019, Tuesday

15.00-16.20 **Industrial/Environmental Engineering Applications** **Ballroom B**
Chair: Ayse Güngör

15.00	HEAT TRANSFER IMPAIRMENT IN FUEL ASSEMBLIES OF ADVANCED GAS-COOLED REACTORS	Charles Moulinec, Juan Uribe, Bing Xu, Alex Skillen and David R. Emerson
15.20	CFD STUDY TO RESOLVE CORROSION PROBLEMS IN REFINERY PROCESS UNITS	Firmansyah, T., Suleiman, M. I., Rakib, M. A., and Al Musharfy, M.
15.40	INTEGRATED LES/ URANS SIMULATIONS OF AN AERO-ENGINE GAS TURBINE INTERACTIONS	R. Adoua, G. Page , P. Legrenzi, and I. Tristanto
16.00	SIMULATION OF CF4 ABATEMENT VIA A DIRECT-CURRENT NON-TRANSFERRED NITROGEN TORCH	Shiu-wu Chau and Shiaw-huei Chen

May 15, 2019, Wednesday

09.00-10.00 **INVITED SPEAKER** — **Ballroom A**
Chair: Hasan U. Akay

THE AERODYNAMICS OF SIMPLIFIED VEHICLES: HIGH PERFORMANCE SPARSE MATRIX COMPUTATIONS WITH APPLICATIONS IN COMPUTATIONAL FLUID DYNAMICS — **Murat Manguoğlu**

10.00-10.30 **Coffee Break**

10.30-12.10 **Parallel Algorithms/Solvers - II** — **Ballroom A**
Chair: Murat Manguoğlu

10.30	MASSIVELY PARALLEL FINITE ELEMENT COMPUTING FOR AEROTHERMAL APPLICATIONS	Youssef Mesri, Alban Bazile and Elie Hachem
10.50	CONJUGATE HEAT TRANSFER PROBLEMS VIA A LATTICE BOLTZMANN SOLVER ON CPU AND GPU: A PERFORMANCE COMPARISON	Gregorio G. Spinelli and Bayram Celik
11.10	STATIC-LOAD BALANCED AND SPATIAL PARTITIONING PARALLEL OVERSET GRID ASSEMBLER WITH IMPLICIT HOLE CUTTER	Orhan Shibliyev and Ibrahim Sezai
11.30	ON THE DEVELOPMENT OF A GPU-BASED IMPLICIT FORCING IMMERSED BOUNDARY METHOD FOR SIMULATING FLUID FLOW PAST A SOLID BODY	Cheng-tao Wu, Rex Kuan-shuo Liu and Tony Wen-hann Sheu
11.50	A GRAPHICS CARD ACCELERATED SURFACE-TO-SURF- ACE RADIATION MODEL FOR OPENFOAM	Kaan Meneksedag, Faizan P. Siddiqui, Altug M. Basol and M. Pinar Menguc

May 15, 2019, Wednesday

10.30-12.10	**Mechanical/Aerospace Engineering Applications - II** Chair: Oh Joon Kwon	**Ballroom B**
10.30	SHAPE MORPHING IN MOLECULAR CLOUD-CLOUD COLLISION AFFECTED BY COHERENT INSTABILITIES	B. Rybakin and V. Goryachev
10.50	EXPERIENCES WITH PARALLEL ICE ACCRETION SIMULATIONS OF AIRPLANE WINGS USING OPENFOAM	Seghaer H. Edeeb, Hasan U. Akay and Serkan Ozgen
11.10	AERODYNAMIC SHAPE OPTIMIZATION FOR REDUCING ICE INDUCED LOSSES ON WIND TURBINE BLADES	Ozcan Yirtici and Ismail H. Tuncer
11.30	LES OF SECONDARY FLOW STRUCTURES DUE TO ENDWALL IN TURBINE FLOWS USING AN IN-HOUSE FLOW SOLVER	Sarp Er and Ayse G. Gungor
11.50	UTILIZATION OF OPEN SOURCE SU2 CODE ON SACCON STABILITY AND CONTROL CONFIGURATION	Arzu Taşkonak, Selin Aradağ and Ünver Kaynak

May 15, 2019, Wednesday

10.30-12.10	**Multi-Scale/Multi-Physics Applications** Chair: Jong-Shinn Wu	**Ballroom C**
10.30	AN OPTIMIZED SCALABLE PARALLEL FRONT-TRACKING METHOD FOR SIMULATION OF MULTIPHASE FLOWS	Z. Ahmed, D. Izbassarov, M. N. Farooqi, D. Unat, M. Muradoglu
10.50	A PARALLEL MONOLITHIC APPROACH FOR THE INCOMPRESSIBLE MAGNETOHYDRODYN- AMICS EQUATIONS	Kayhan Ata and Mehmet Sahin
11.10	MULTISCALE SIMULATION OF EVAPORATION USING THE MULTISCALE UNIVERSAL INTERFACE	S. M. Longshaw, R. Pillai, L. Gibelli, D. R. Emerson and D. A. Lockerby
11.30	APPLICATION OF D2Q5 PRESSURE BOUNDARY CONDITIONS FOR PARALLEL D2Q9 LATTICE BOLTZMANN METHOD	Nevsan Sengil and Fadile Y. Comez
11.50	A MATHEMATICAL MODEL FOR AIR TREATMENT	Yu. Karamzin, T. Kudryashova, V. Podryga, S. Polyakov, B. Puzyrkov and N. Tarasov

12.10-13.30 Lunch Break

May 15, 2019, Wednesday

13.30-14.30 **INVITED SPEAKER** — **Ballroom A**
Chair: Hasan U. Akay

TA PARALLEL 26-MOMENT APPROACH FOR RAREFIED GAS DYNAMICS USING CODE_SATURNE — **David R.Emerson**

14.30-15.00 **Coffee Break**

15.00-16.40 **Parallel Algorithms/Solvers - III** — **Ballroom A**
Chair: David R.Emerson

15.00	CFD WORKFLOW OPTIMIZATION ON LARGE SUPERCOMPUTERS	Rooh Khurram
15.20	AN EXPLICIT MULTIGRID SCHEME USING ARTIFICIAL COMPRESSIBILITY METHOD FOR THE SIMULATION OF UNSTEADY INCOMPRESSIBLE FLOWS ON MULTI-GPU CLUSTER	Xiao-lei Shi and Chao-an Lin
15.40	OPTIMIZATION OF A GAS-PARTICLE FLOW SOLVER ON VECTOR SUPERCOMPUTERS	Yoichi Shimomura, Midori Kano, Takashi Soga, Kenta Yamaguchi, Akihiro Musa, Yusuke Mizuno, Shun Takahashi, Ryusuke Egawa and Hiroyuki Takizawa
16.00	A FULLY IMPLICIT ALE FORMULATION INCLUDING SURFACE TENSION FOR MULTIPHASE FLOWS	Cagatay Guventurk and Mehmet Sahin
16.20	3D FRONT-TRACKING METHOD WITH ADAPTIVE MESH REFINEMENT FOR MULTIPHASE FLOW	Ibrahim Nasuh Yildiran and Metin Muradoglu

May 15, 2019, Wednesday

15.00-16.40	**Turbulence/Aeroacoustics** Chair: Chen Jun	**Ballroom B**
15.00	SPATIO-TEMPORAL SPECTRA OF ADVERSE PRESSURE GRADIENT TURBULENT BOUNDARY LAYERS	Taygun Recep Gungor, Ayse Gul Gungor, Yvan Maciel and Mark Phil Simens
15.20	BOUNDARY LAYER TRANSITION PREDICTION OVER WIND TURBINE BLADE PROFILE THROUGH DETACHED EDDY SIMULATION	Özgür Yalçın and Yusuf Özyörük
15.40	TURBULENCE CHARACTERISTICS OF A SHALLOW MIXING LAYER DEVELOPING OVER FLAT SURFACE AND 2-D DUNES	Gokhan Kirkil
16.00	FLOW AND NOISE PREDICTION OF DOORS-ON M219 CAVITY THROUGH IMPROVED DELAYED DETACHED EDDY SIMULATIONS	Seyfettin Coşkun and Yusuf Özyörük
16.20	NOISE REDUCTION OF OPEN CAVITIES BY PASSIVE FLOW CONTROL METHODS AT TRANSONIC SPEEDS USING OPENFOAM	Oğuzhan Demir, Bayram Çelik and Kürşad Melih Güleren

PARALLEL CFD 2019

May 14-17, 2019, Antalya TURKEY

May 16, 2019, Thursday

09.00-10.00	**INVITED SPEAKER** Chair: Hasan U. Akay	**Ballroom A**
	LATTICE BOLTZMANN METHOD: THE CFD METHOD ON MODERN COMPUTER ARCHITECTURE	**Xiaowen Shan**
10.00-10.30	**Coffee Break**	
10.30-11.50	**Parallel Algorithms/Solvers - IV** Chair: Xiaowen Shan	**Ballroom A**
10.30	GPU-ACCELERATED HIGH-ORDER SOLVER FOR SIMULATING 3D INCOMPRESSIBLE NAVIER-STOKES EQUATIONS IN COMPLEX DOMAIN	Neo Shih-chao Kao and Tony Wen-hann Sheu
10.50	ACHIEVING LOAD BALANCE ON CPU + MIC HETEROGENEOUS PLATFORM FOR A COMBUSTION SIMULATION APPLICATION	Yonggang Che, Chuanfu Xu and Zhenghua Wang
11.10	SPH METHOD. APPLICATIONS IN DAM ENGINEERING	David López Gómez and Vicente Cuellar Moro
11.30	PARALLELIZATION OF A NEW CFD BOUNDARY CONDITION FOR EVOLVING ARTERIOVENOUS MALFORMATIONS	Gökçe Nur Oğuz, Şenol Pişkin and Kerem Pekkan
10.30-11.50	**Mechanical/Aerospace Engineering Applications - III** Chair: Ismail H. Tuncer	**Ballroom B**
10.30	PARALLEL CFD MODELING OF COLD FLOW IN GAS CIRCUIT BREAKERS	Saleh K. Abuhanieh and Hasan U. Akay
10.50	DESIGN OPTIMIZATION OF A 2-D SCRAMJET INLET	Mehmet Basaran, Engin Leblebici and Ismail H. Tuncer
11.10	NUMERICAL INVESTIGATION OF VORTICAL FLOWS OVER A CLOSE-COUPLED DELTA CANARD-WING CONFIGURATION	Kaan Yutuk, Alp Tikenogullari and Ismail H. Tuncer
11.30	PARALLEL DIRECT NUMERICAL SIMULATION AND ANALYSIS OF RAYLEIGH-BÉNARD CONVECTION	Ilyas Yilmaz

CONFERENCE COMMITTEES

Organizing Committee

Co-chair - Hasan U. Akay - Atilim University
Co-chair - Ismail H. Tuncer - Middle East Technical University
David R. Emerson - Daresbury Laboratory, UK
Ulgen Gulcat - Istanbul Technical University
Murat Manguoglu - Middle East Technical University
Metin Muradoglu - Koc University
Mehmet Sahin - Istanbul Technical University

Advisory/Scientific Committee

Ramesh K. Agarwal - Washington University in St. Louis, USA
Shahrouz Aliabadi - Jackson State University, USA
Ron Bailey - NASA-Ames Research Center, USA
Lorena Barba - George Washington University, USA
Rupak Biswas - NASA-Ames Research Center, USA
Gunther Brenner - Technical University of Clausthal, Germany
Boris Chetverushkin - Academy of Science, Russia
Anil Deane - University of Maryland, USA
Akin Ecer - IUPUI, USA
David R. Emerson - Daresbury Laboratory, UK
Jocelyne Erhel - SAGE INRIA-team, France
Marco Fossati - University of Strathclyde, UK
Pat Fox - IUPUI Purdue School, USA
Marc Garbey - University of Houston, USA
Wagdi Habashi - McGill University, Canada
David Keyes - Columbia University, USA
Jang-Hyuk Kwon - KAIST, Republic of Korea
Trond Kvamsdal - SINTEF Applied Mathematics, Norway
Keqin Li - Hunan University, China
Isaac Lopez - Army Research Laboratory, USA
Chao-An Lin - National Tsing Hua University, Taiwan
James McDonough - University of Kentucky, USA
Koji Morinishi - Kyoto Institute of Technology, Japan
Charles J. Nietubicz - Army Research Laboratory, USA
Sergey Peigin - Israel Aircraft Industries, Israel
Jacques Periaux - CIMNE/UPC, Spain
Nobuyuki Satofuka - University of Shiga Prefecture, Japan
Pasquale Schiano - Centro Italiano Ricerche Aerospziali, Italy
Daniela di Serafino - Seconda Università degli studi di Napoli, Italy
Chunhua Sheng - University of Toledo, USA
Matthew Smith - National Cheng Kung University, Taiwan
Damien Tromeur-Dervout - University of Claude Bernard Lyon, France
Mariano Vazquez - Barcelona Supercomputing Center, Spain
Gerhard Wellein - University of Erlangen, Germany
Jong-Shinn Wu - National Chiao Tung University, Taiwan
Huidan (Whitney) Yu - IUPUI, USA

Social Events

Welcome Cocktail
Tuesday May 14, 18.00-21.00

Banquet Dinner
Wednesday May 15, 19.30-22.30

Lunch Buffet/Box
Tuesday-Thursday May 14-16, 12.30-13.30

Excursion to Termessos, Fish Dinner at Duden
Thursday May 16, 13.30-22.00

Termessos

Termessos was a Pisidian city built at an altitude of more than 1500 meters at the south-west side of the mountain Solymos (modern-day Güllük Dağı soaring to a height of 1,665 metres) in the Taurus Mountains. The city was founded by the Solims who were mentioned by Homer in the Iliad in connection with the legend of Bellerophon. It lies 30 kilometres to the north-west of Antalya. Concealed by pine forests and with a peaceful and untouched appearance, the site has a more distinct and impressive atmosphere than many other ancient cities. Termessos is one of the best preserved ancient cities of Anatolia.



PARALLEL CFD 2019

May 14-17, 2019, Antalya TURKEY

Sponsors

METU

1996
ATILIM UNIV.

İSTANBUL TEKNİK ÜNİVERSİTESİ 1773
ITU