CTPL Lab is Organizing an International Workshop on Simulations of Flow and Transport: Modeling, Algorithms and Computation Within ICCS 2022 Conference

ICCS 2022 –London, United Kingdom

"The Computational Planet"

The International Conference on Computational Science is an annual conference that brings together researchers and scientists from mathematics and computer science as basic computing disciplines, researchers from various application areas who are pioneering computational methods in sciences such as physics, chemistry, life sciences, and engineering, as well as in arts and humanitarian fields, to discuss problems and solutions in the area, to identify new issues, and to shape future directions for research. ICCS is an A-rank conference in the CORE classification. ICCS 2022 in London, United Kingdom, will be the twenty-second in this series of highly successful conferences.

Modeling of flow and transport is an essential component of many scientific and engineering applications, with increased interests in recent years. Application areas vary widely, and include groundwater contamination, carbon sequestration, air pollution, petroleum exploration and recovery, weather prediction, drug delivery,

material design, chemical separation processes, biological processes, and many others. However, accurate mathematical and numerical simulation of flow and transport remains a challenging topic from many aspects of physical modeling, numerical analysis and scientific computation. Mathematical models are usually expressed via nonlinear systems of partial differential equations, with possibly rough and discontinuous coefficients, whose solutions are often singular and discontinuous. An important step of a numerical solution procedure is to apply advanced discretization methods (e.g. finite elements, finite volumes, and finite differences) to the governing equations. Local mass conservation and compatibility of numerical schemes are often necessary to obtain physical meaningful solutions. Another important solution step is the design of fast and accurate solvers for the large-scale linear and nonlinear algebraic equation systems that result from discretization. Solution techniques of interest include multiscale algorithms, mesh adaptation, parallel algorithms and implementation, efficient splitting or decomposition schemes, and others.

The international workshop on "Simulations of Flow and Transport: Modeling, Algorithms and Computation" (SOFTMAC) has been held 10 years since 2011 within the International Conference on Computational Science (ICCS). The aim of this symposium is to bring together researchers in the aforementioned field to highlight the current developments both in theory and methods, to exchange the latest research ideas, and to promote further collaborations in the community. We invite original research articles describing the recent advances in mathematical modeling, computer simulation, numerical analysis, and other computational aspects of flow and transport phenomena of flow and transport. Potential topics include, but are not limited to:

1. advanced numerical methods for the simulation of subsurface and surface flow and transport, and associated aspects such as discretization, gridding, upscaling, multiscale algorithms, optimization, data assimilation, uncertainty assessment, and high performance parallel and grid computing;
2. spatial discretization schemes based on advanced finite element, finite volume, and finite different methods; schemes that preserve local mass conservation (such as mixed finite element methods and discontinuous Galerkin methods) are of particular interest;
3. decomposition methods for improved efficiency and accuracy in treating flow and transport problems; decomposition methods for nonlinear differential equations and dynamical systems arising in flow and transport; temporal discretization schemes for flow and transport;
4. a-priori and a-posteriori error estimates in discretizations and decompositions; numerical convergence study; adaptive algorithms and implementation;
5. modeling and simulation of single-phase and multi-phase flow in porous media or in free space, and its applications to earth sciences and engineering;
6. modeling and simulation of subsurface and surface transport and geochemistry, and its application to environmental sciences and engineering;

7. computational thermodynamics of fluids, especially hydrocarbon and other oil reservoir fluids, and its interaction with flow and transport;
8. computational modeling of flow and transport in other fields, such as geological flow/transport in crust and mantle, material flow in supply chain networks, separation processes in chemical engineering, information flow, biotransport, and intracellular protein trafficking, will also be considered.

Papers Submission

We cordially invite original research articles as well as review articles describing the recent advances in mathematical modeling, computer simulation, numerical analysis, and other computational aspects of flow and transport phenomena of flow and transport.

The manuscripts of up to **14 pages**, written in English and formatted according to the Springer LNCS templates, should be submitted electronically via EasyChair. You also have the option of submitting a short paper of up to **7 pages**. Both Full and Short Papers use the same templates and are published in LNCS. Templates are available for download in EasyChair's "Templates" menu. While submitting please don't forget to select the workshop: **International Workshop on Simulations of Flow and Transport: Modeling, Algorithms and Computation (SOFTMAC)**. At least one author of an accepted paper must register at the conference site and present the paper at the workshop.

All papers will be peer reviewed. All accepted papers will be included in the Springer Lecture Notes in Computer Science (LNCS) series and indexed by Scopus, EI Engineering Index, Thomson Reuters Conference Proceedings Citation Index (included in ISI Web of Science), and several other indexing services. The papers will contain linked references, XML versions and citable DOI numbers. After the conference, the best papers will be invited for a special issue of the Journal of Computational Science (Impact Factor: 3.976).

Important dates

Paper submission: 21 January 2022
Notification to authors: 21 March 2022
Camera-ready papers: 11 April 2022
Author registration: 21 March – 11 April 2022
Non-author registration (in-person): 21 March – 20 May 2022
Non-author registration (online): 21 March – 10 June 2022
Conference sessions: 21-23 June 2022

Other information

For information on conference venue, accommodation, registration, etc. please refer to the conference site. https://www.iccs-meeting.org/iccs2022/

Workshop Organizer and Co-organizer

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History of SOFTMAC Workshop

NO.	Our Workshop	ICCS Theme	Time and Location
1	Flow and Transport: Computational Challenges	The Ascent of Computational Excellence	Nanyang Technological University, Singapore, 1-3 June, 2011
2	Flow and Transport: Modeling, Simulations and Algorithms	Empowering Science through Computing	Omaha, Nebraska, USA, 4-6 June, 2012
3	Flow and Transport: Modeling, Simulations and Algorithms	Computation at the Frontiers of Science	Barcelona, Spain, 5- 7 June, 2013
4	Computational Flow and Transport: Modeling, Simulations and Algorithms	Computational Science at the Gates of Nature	Reykjav k, Iceland, 1-3 June, 2015

5	Computational Flow and Transport: Modeling, Simulations and Algorithms	Data through the Computational Lens	San Diego, California, USA, 6-8 June, 2016
6	Simulations of Flow and Transport: Modeling, Algorithms and Computation	The Art of Computational Science. Bridging Gaps – Forming Alloys	Zürich, Switzerland, 12-14 June, 2017
7	Simulations of Flow and Transport: Modeling, Algorithms and Computation	Science at the Intersection of Data, Modelling and Computation	Wuxi, China, 11-13 June, 2018
8	Simulations of Flow and Transport: Modeling, Algorithms and Computation	Computational Science in the Interconnected World	Faro, Algarve, Portugal, 12-13 June, 2019
9	Simulations of Flow and Transport: Modeling, Algorithms and Computation	20 Years of Computational Science	Amsterdam, The Netherlands, 3-5 June, 2020
10	Simulations of Flow and Transport: Modeling, Algorithms and Computation	Computational Science for a Better Future	Kraków, Poland, 16-18 June, 2021