ICTT-26 Conference program

Paris, 22nd – 27th September 2019

Sorbonne University, Pierre & Marie Curie Campus (UPMC)

Room 102 and 108, in the building between Towers 44 and 45

4, place Jussieu 75005 PARIS

http://www.cea.fr/nucleaire/tripoli-4/Pages/Events/ictt2019/ICTT2019.aspx

Following the tradition of the "**Blacksburg Meetings**", the ICTT conference aims at bringing together researchers from the mathematics, physical and engineering communities working on analytical and computational methods for the transport equations arising in an astounding number of applications. Topics covered at ICTT 2019 will include but are not restricted to: of neutron transport & reactor physics, transport of charged particles and phonons, radiative transfer and hydrodynamics, kinetic models for classical particles and for life sciences, applications of transport in stereology for video and light propagation.

The 26th International Conference on Transport Theory (**ICTT-26**) will be held in **Paris** (France), **September 22nd-27th, 2019**. The sessions will take place at the *Pierre et Marie Curie campus* (UPMC) of the **Sorbonne University**.

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Journal of Computational and Theoretical Transport

The conference venue:

Sorbonne University, Pierre & Marie Curie Campus (UPMC)

4, place Jussieu 75005 PARIS

The conference rooms are located in the building between **Towers 44 and 45** (see the plan below). **Reception** will be in **Room 102**, and **talks** will be in **Room 108**.
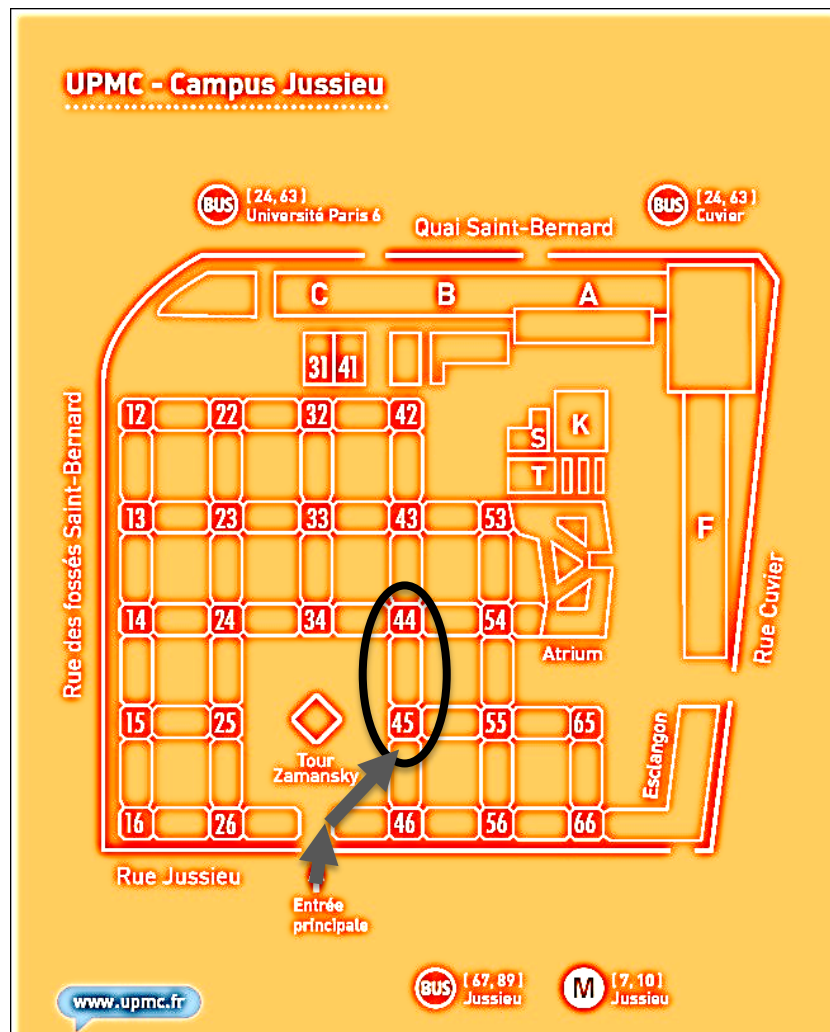
The **UPMC** campus can be accessed by **public transportation**:

- metro lines **7** and **10** ("**Jussieu**" station)
- bus lines **67** and **89** ("**Jussieu**" stop) or line 63 ("**Université Paris 6**" stop)

Sunday, September 22nd

Welcome reception – UPMC, Room 102, in the building between Towers 44 and 45

Monday, September 23rd

Welcome and introduction, 8h15 – 8h40

Transport applications in medical and life sciences, 8h40-10h20

One-way Coupled Benchmark for Combined-Hyperthermia-Radiotherapy Treatment in Slab Geometry, **B. D. Ganapol** (University of Arizona), J. K. Patel, R. Vasques

Concentration waves of bacteria at the mesoscale, **V. Calvez** (Institut Camille Jordan & Université Claude Bernard Lyon, France)

Estimating radiotherapy dose deposition uncertainties due to biological motion, **R. Barnard** (Western Washington University), J. Kusch

Kinetic models with non-local sensing determining cell polarization and speed according to independent cues, **N. Loy** (Politecnico di Torino), L. Preziosi

Coffee break, 10h20-10h35

Plenary talk, 10h35-11h15

Issues with material motion corrections for thermal radiative transport simulations, **N. A. Gentile** (LLNL)

Hydrodynamics and radiative transfer, 11h15-12h55

A new Implicit Monte-Carlo scheme for the transport equation coupled to Stefan's law without teleportation error and without tilt, **G. Poette** (CEA/CESTA), X. Valentin

Acceleration of Positivity-Preserving Transport Schemes using the Variable Eddington Factor Method, **B. C. Yee** (LLNL), T. S. Haut, V. Z. Tomov, M. Holec, S. S. Olivier

Method of Characteristics Moment Closure, a Numerical Method for Covariant Radiation Magnetohydrodynamics, **B. R. Ryan** (LANL) J. C. Dolence

An efficient coupling of thermal radiation transport to Lagrangian hydrodynamics on high-order curvilinear meshes, **M. Holec** (LLNL), T. S. Haut, V. Z. Tomov, B. C. Yee, B. S. Southworth

Lunch break, 12h55-14h25

Phonons, charged particles & solid state, 14h25-16h30

The Screening Effect in a Fermi Plasma: the Influence of the Motion of Fermi Ions, V. Molinari, D. Giusti, **B. Bodmann** (Universidade Federal do Rio Grande do Sul)

The effect of electron-electron scattering in graphene, M. Coco, **V. Romano** (U. Catania), G. Nastasi

Modeling of ion beam propagation in matter using entropic moment method, E. Olivier, **T.-H. Nguyen-Bui** (CELIA, Université de Bordeaux – CNRS – CEA), Ch. Champion, B. Dubroca

A macroscopic model for phonon transport in graphene, **G. Mascali** (U. Catania), V. Romano

A double kinetic equation solver for conducto-radiative heat transfer in porous ceramics, **B. Dubroca** (CNRS - Univ. Bordeaux – Safran - CEA), R. Turpault, G. Vignoles

Coffee break, 16h30-16h45

Methods for reactor physics, 16h45-18h

Towards a solver based on a discrete ordinate method for reactor neutron noise simulations in the frequency domain, H. Yi, **P. Vinai** (Chalmers University of Technology), Ch. Demazière

Strange attractors in eigenvalue problems, **D. Mancusi** (CEA/Saclay), A. Zoia

A constraint based local refinement methodology for isogeometric analysis (IGA) of the self-adjoint angular flux (SAAF) equation with applications to radiation shielding analyses, **C. Latimer** (Imperial College London), J. Kophazi, M. D. Eaton, R. G. McClarren

Tuesday, September 24th

Methods for reactor physics and radiation transport, 8h15-10h20

Sweep-free high-order negative flux fixup schemes, **R. P. Smedley-Stevenson** (AWE, PLC)

The domain decomposition method applied to the discrete-ordinates transport solver IDT: scalability test on high-performance computing machines, **E. Masiello** (CEA Saclay), R. Lenain, W. Ford

Reviewing the computational performance of deterministic SN transport sweeps on many-core architectures, **T. Deakin** (University of Bristol), Simon McIntosh-Smith, Justin Lovegrove, Richard Smedley-Stevenson and Andrew Hagues

Space–time reduced order model for Boltzmann transport equation, **Y. Choi** (LLNL), W. Arrighi, P. Brown, R. Anderson

Core calculation based on the method of dynamic homogenization, **A. Galia** (CEA Saclay), I. Zmijarevic, R. Sanchez

Coffee break, 10h20-10h35

Monte Carlo methods, 10h35-12h40

Fission matrix application to acceleration and convergence testing for Monte Carlo criticality calculations, **F. B. Brown** (LANL), C. J. Josey, S. Henderson, W. R. Martin

Direct and adjoint Monte Carlo methods for alpha-eigenvalue spectral analysis, **V. Vitali** (CEA Saclay), F. Chevallier, A. Jinaphanh, P. Blaise, A. Zoia

Scalability of GPU Assisted Reactor Dynamic Analysis (GUARDYAN), **B. Molnár** (Budapest University of Technology and Economics), G. Tolnai, D. Légrády

On the developments of a neutron transport Monte Carlo simulator: flux spectra parametrization, L. F. F. C. Barcellos, **B. E. J. Bodmann** (Universidade Federal do Rio Grande do Sul), S. Q. Bogado Leite, M. T. M. B. de Vilhena

Adjoint-weighted tallies in time eigenvalues Monte Carlo calculations, **A. Jinaphanh** (CEA Saclay), A. Zoia

Lunch break, **12h40-14h10**

Neutron fluctuations, 14h10-15h25

Deterministic transport simulation of neutron counting statistics, **Ph. Humbert** (CEA/DAM)

Fluctuations and spatial correlations in zero-power research reactors, **B. Dechenaux** (IRSN), E. Dumonteil

One-speed transport calculation of the multiplicity moments in nuclear safeguards, **I. Pàzsit** (Chalmers University)

Coffee break, 15h25-15h40

Plenary talk, 15h40-16h20

Fermi and the Boltzmann equation, **P. Ravetto** (Politecnico di Torino)

Special session in honor of Prof. Piero Ravetto, 16h20-18h

Eigenvalue formulations for the spherical harmonics approximation to the neutron transport equation, N. Abrate, M. Burrone, **S. Dulla** (Politecnico di Torino), P. Ravetto, P. Saracco

Recent studies on the discrete ordinates discretization error in the uncollided point-wise scalar flux, X. Hu, **Y. Y. Azmy** (North Carolina State University)

Improving computational efficiency of Comet via discrete polynomial expansion, **F. Rahnema** (Georgia Institute of Technology), D. Zhang

On Xenon Fission Product Poisoning, **B. Ganapol** (University of Arizona), S. Schunert, F. Gleicher, R. Martineau and M. DeHart

Cocktail event

"Salle Tipi", UPMC

Wednesday, September 25th

Methods for reactor physics, 8h15-10h20

Performance assessment of Boundary Projection Acceleration applied to a short-characteristics heterogeneous Cartesian meshes solver, **A. Previti** (Framatome), E. Masiello

Deriving the Time-Dependent Asymptotic PN Approximation, R. Harel, S. Burov, **S. I. Heizler** (The Hebrew University)

Application of Anderson acceleration to the neutron transport equation, **A. Calloo** (CEA Saclay)

On a Recent Theoretical Result on Diffusion Limits of Numerical Methods for the SN Transport Equation in Optically Thick Diffusive Regimes, **D. Wang** (The Ohio State University)

A high-order MOC including a spatial polynomial expansion for cross sections, **A. Gammicchia** (CEA Saclay), S. Santandrea, S. Dulla

Coffee break, 10h20-10h35

Plenary talk, 10h35-11h15

SPN finale, **R. Sanchez** (CEA Saclay)

Kinetic models and gases, 11h15-12h55

Global existence of solutions of a fluid-kinetic model for respiratory aerosols, **D. Michel** (Sorbonne Université), L. Boudin, A. Moussa

Kinetic models of BGK type for mixtures of monoatomic or polyatomic gases, **M. Bisi** (Università di Parma)

Cross-coupling effect of mass and heat flows in a rarefied gas around a sphere, **S. Taguchi** (Kyoto University)

Rigorous convergence of the Boltzmann multi-species equation towards the Maxwell-Stefan model for diffusion, **A. Bondesan** (Université Paris Descartes), L. Boudin, M. Briant, B. Grec

Lunch break, 12h55-14h25

Analytical and semi-analytical solutions, 14h25-16h30

Recent studies on two-dimensional radiative transfer problems in anisotropic media, K. Rui, **L. Basso Barichello** (Universidade Federal do Rio Grande do Sul)

Neutron transport in a multi-region sphere, **R. D. M. Garcia** (Instituto de Estudos Avançados)

Partial Range Completeness of Case Eigenfunctions and Numerical Solution of Singular Integral Equations of Particle Transport Problems, **D.C. Sahni** (Terna Engineering College), R.G. Tureci, A.Z. Bozkir

Radiative transfer in half spaces of arbitrary dimension, **E. d'Eon** (Autodesk), N. J. McCormick

Verification of a Production 2D MOC Code with Manufactured and Semi-Analytical Solutions, J. Wang, **W. R. Martin** (University of Michigan), B. S. Collins

Coffee break, 16h30-16h45

Optimal and stochastic transport, 16h45-18h

Birthday Monte Carlo (BMC): Using the Monte Carlo Method to Predict the Number of Future Facebook Birthday Posts, **M. O'Brien** (LLNL)

On the optimal control of the Keilson-Storer master equation, **J. Bartsch** (Universitat Wurzburg), G. Nastasi, A. Borzì

A numerical investigation of Brockett's Liouville ensemble optimal control problems, **J. Bartsch** (Universitat Wurzburg), A. Borzì, S. Roy

Thursday, September 26th

General methods for transport problems, 8h15-10h20

Trefftz methods for transport equations with boundary layers, **G. Morel** (Inria Rennes), Ch. Buet, B. Després

Numerical solution of the azimuth-dependent Fokker-Planck equation in 1d slab geometry, **O. Lòpez Pouso** (University of Santiago de Compostela, Spain), N. Jumaniyazov

Nonlinear Fokker-Planck Acceleration for Forward-Peaked Transport Problems in Slab Geometry, J. K. Patel, **J. J. Kuczek** (The Ohio State University), R. Vasques

Angular adaptivity for resolving ray-effects in Boltzmann transport, **S. Dargaville** (Imperial College London), C.C. Pain, A.G. Buchan, R.P. Smedley-Stevenson, P.N. Smith

Ray-effect mitigation in the SN method, **T. Camminady** (KIT), M. Frank, C. D. Hauck, and J. Kusch

Coffee break, 10h20-10h35

Plenary talk, 10h35-11h15

The Albedo Problem in Nonexponential Radiative Transfer, **E. D'Eon** (Autodesk)

Transport in porous and random media, 11h15-12h55

The linear transport in porous media, K. Amagai, M. Yamakawa, **M. Machida** (Hamamatsu University), Y. Hatano

A Nonclassical Monte Carlo Algorithm for Transport Problems in Diffusive Binary Stochastic Media, R. Vasques, P. S. Brantley, **R. K. Palmer** (The Ohio State University)

On a Consistent Markovian Formulation of Transport in 1D Planar Random Media, **A. K. Prinja** (University of New Mexico) and C. M. Skinner

Analysis of linear transport in stochastic media with material sources, **C. Larmier** (CEA Saclay), S. Lemaire, D. Mancusi, D. Riz, A. Zoia

Lunch break, 12h55-14h25

Kinetic models and gases, 14h25-16h05

Analytical solution of a gas release problem considering permeation with time dependent boundary conditions, K. Nagatou, **M. Schulz** (KIT), F. Arbeiter, A. von der Weth, R. Dagan

Transition to turbulence in the weakly stratified Kolmogorov flow, **F. Gargano** (University of Palermo), M. Sammartino, V. Sciacca

Influence of the domain of particle pairs interactions on the results of the statistical modeling of rarefied gas flows, **A.I. Khisamutdinov** (Novosibirsk State University)

Hydrodynamic equations for binary gas mixtures with dominant elastic collisions, M. Bisi, Maria Groppi, **G. Martalò** (University of Parma)

Coffee break, 16h05-16h20

Applications to light transport & computer graphics, 16h20-17h35

Photon surfaces for robust, unbiased volumetric density estimation in computer graphics, X. Deng, S. Jiao, B. Bitterli, **W. Jarosz** (Darmouth College)

A null-scattering path integral formulation of light transport, **B. Miller** (Darmouth College), I. Georgiev, W. Jarosz

A radiative transfer framework for rendering non-exponential media in computer graphics, B. Bitterli, S. Ravichandran, T. Muller, M. Wrenninge, J. Novak, S. Marschner, **W. Jarosz** (Darmouth College)

Social dinner

Restaurant "Le Train Bleu", Paris

Friday, September 27th

Phonons, charged particles & solid state, 8h15-10h20

Moving interfacial scattering into the Boltzmann transport equation for transport simulations of phonons, J. Harter, G. Romano, A. Hosseini, T. Palmer, **P. A. Greaney** (UC Riverside)

On the Landau Levels and Quantum Diamagnetism, V. Molinari, D. Giusti, **B. Bodmann** (Universidade Federal do Rio Grande do Sul)

Quantum decoherence effects on a scattering process in the Wigner picture, L. Barletti, **E. Giovannini** (Università di Firenze)

Phonon transport prediction of thermal conductivity in lithium aluminate, **N. H. Whitman** (Oregon State University), T. S. Palmer

Quantum drift-diffusion equations for a 2-dimensional electron gas with spin-orbit interaction, **L. Barletti** (Università di Firenze), Ph. Holzinger, A. Jungel

Coffee break, 10h20-10h35

Plenary talk, 10h35-11h15

Matrix Riccati equation solution of the radiative transfer equation: A Progress Report, **B. D. Ganapol** (University of Arizona), J. Patel

Methods for reactor physics, 11h15-12h55

Shallow Artificial Neural Networks to Accelerate Radiation Transport Sweeps, M. E. Tano, **J. C. Ragusa** (Texas A&M University)

On the Ronen method in simple 1-d problems, **D. Tomatis** (CEA Saclay), R. Gross and E. Gilad

On the validity and usage of the scattering source term within the Boltzmann transport equation, **R. Dagan** (KIT), A. Konobeyev

On the effect of angular and spatial discretization on perturbation calculations, **Z. I. Böröczki** (Budapest University of Technology and Economics), M. Szieberth, A. Rineiski, F. Gabrielli

Lunch break, 12h55-14h25

Hydrodynamics & radiative transfer, 14h25-16h30

Considerations for Monte Carlo transport of thermal X-rays in a higher-order finite element framework, **K. Zieb** (LLNL), S. Weeratunga, R. Vega, T. Brunner, N. Gentile

Efficient radiation diffusion for smoothed particle hydrodynamics, **B. Bassett** (LLNL) and J. M. Owen

DSA Preconditioning for DG discretizations of High-Order SN transport on Curved Meshes, **T. S. Haut** (LLNL), B. S. Southworth, P. G. Maginot, V. Z. Tomov, W. Pazner

Asymptotic analysis of the high-order, low-order method with time-continuous, particle-based transport solvers, **H. Park** (LANL)

Accurate solutions of the radiative transfer problem via theory of connections, **M. De Florio** (University of Arizona; Università di Bologna), E. Schiassi, R. Furfaro, B. D. Ganapol, D. Mostacci

Coffee break

Conference ends

Poster contributions

Throughout the conference, posters will be displayed in **Room 108** and authors will have the possibility of presenting and discussing their work.

- *Event based simulation of 2D particles gas in a gradient of temperature*, **S. Vitali** (University of Bologna), C. E. Montanari, M. Monti, G. Castellani, A. Bazzani

- *A moment closure based on projections on the boundary of the realizability domain*, **T. Pichard** (Ecole Polytechnique)

- *Hybrid CPU-GPU Load Balancing for Monte Carlo Particle Transport*, **M. J. O'Brien** (LLNL), M. S. McKinley, S. A. Dawson, P. S. Brantley, R. C. Bleile, N. A. Gentile

- *Numerical solution of the Boltzmann transport equation for photons*, **O. Lopez Pouso** (University of Santiago de Compostela), T. Kumar Das

- *Methods "Successive approximations over Characteristic interactions" for interpretation of measurements data and evaluation of Transport equation coefficients*, **A. I. Khisamutdinov** (Trofimuk Institute of Petroleum Geology and Geophysics of SB RAS)

- *Charge and phonon transport in suspended monolayer graphene*, **M. Coco** (University of Florence), G. Mascali, V. Romano

- *Nonexponential Radiative Transfer: Reciprocity, Monte Carlo Estimation and Diffusion Approximation*, **E. d'Eon** (Autodesk)

- *Asymptotic Derivation of the Simplified PN Equations for Nonclassical Transport with Anisotropic Scattering*, **R. K. Palmer** (The Ohio State University), R. Vasques

- *Discontinuous Galerkin approach for the simulation of charge transport in graphene*, **G. Nastasi** (University of Catania), V. Romano

- *On Linear Stochastic Theory of Neutron Transport in distributed Reactor Model*, **R. Nesterenko** (Moskow)

- *Precision Benchmark of the COG Monte Carlo Code*, E. Lent, D. Heinrichs, **B. Ganapol** (Arizona University)

- *P1 Synthetic Acceleration for Nonclassical Spectral SN Equations in Slab Geometry*, J. K. Patel, L. R.C. Moraes, R. Vasques, **R. C. Barros** (Universidade do Estado do Rio de Janeiro)

- *Analysis of spatial and spectral effects on the neutron flux in the vicinity of absorbers*, **M. Massone** (ENEA), Sandra Dulla