

# MILAN KUCHARIK

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## Contact Information:

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Czech Technical University in Prague  
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## Education:

**Mar. 2002 – May 2006** PhD study in Physics, Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague. Thesis title: “Arbitrary Lagrangian-Eulerian (ALE) Methods in Plasma Physics”.

**Sep. 1996 – Feb. 2002** Master study in Computational Physics, Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague. Thesis title: “Difference Schemes for Conservation Laws in 3D”.

**Jan. 2000 – May 2000** One semester study at the Department of Mathematics and Statistics of the University of New Mexico, Albuquerque (NM), USA.

## Professional:

**Since Feb. 2019** Associate professor of Applied Mathematics, Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering.

**Aug. 2009 – Jan. 2019** Assistant professor and researcher, Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering.

**Jul. 2006 – Jul. 2009** Postdoc in Mathematical Modeling and Analysis Group (T-5/T-7) of the Los Alamos National Laboratory, Los Alamos (NM), USA.

**May 2005 – Jul. 2005** Graduate Research Assistant in the Los Alamos National Laboratory, Los Alamos (NM), USA.

**Jan. 2005 – Jul. 2006** Technical staff member of the Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering.

**May 2003 – Aug. 2003** Graduate Research Assistant in the Los Alamos National Laboratory, Los Alamos (NM), USA.

**May 2002 – Aug. 2002** Graduate Research Assistant in the Los Alamos National Laboratory, Los Alamos (NM), USA.

## Research Interests:

- Computational Physics, Applied Mathematics, Conservation Laws, solving PDEs in multiple dimensions.
- Development and analysis of Arbitrary Lagrangian-Eulerian (ALE) methods for gas dynamics and plasma physics.
- Conservative interpolations of functions, applications in the context of ALE methods.
- Lagrangian models, mesh rezoning, and remapping algorithms for multimaterial ALE codes.
- Applications of ALE methodology in simulations of laser/plasma interactions.
- Simulations of laser beam interactions with various targets.
- Analysis of hydrodynamic laser/plasma simulations.

**Selected recent publication:**

- J. Nikl, M. Kucharik, S. Weber, High-order curvilinear finite element magneto-hydrodynamics I: A conservative Lagrangian scheme, *Journal of Computational Physics*, Vol. 464, pp. 111158, 2022. Impact factor: 4.645.
- M. Kucharik, G. Scovazzi, M. Shashkov, R. Loubere, A Multi-Scale Residual-Based Anti-Hourglass Control for Compatible Staggered Lagrangian Hydrodynamics, *Journal of Computational Physics*, Vol. 354, pp. 1-25, 2018. Impact factor: 4.645.
- M. Klima, M. Kucharik and M. Shashkov, Local Error Analysis and Comparison of the Swept- and Intersection-Based Remapping Methods, *Communications in Computational Physics*, Vol. 21, Iss. 2, pp. 526-558, 2017. Impact factor: 3.791.
- D. Margarone, A. Velyhan, J. Dostal, J. Ullschmied, J. P. Perin, D. Chatain, S. Garcia, P. Bonnay, T. Pisarczyk, R. Dudzak, M. Rosinski, J. Krasa, L. Giuffrida, J. Prokupek, V. Scuderi, J. Psikal, M. Kucharik, M. De Marco, J. Cikhardt, E. Krousky, Z. Kalinowska, T. Chodukowski, G. A. P. Cirrone and G. Korn, Proton Acceleration Driven by a Nanosecond Laser from a Cryogenic Thin Solid-Hydrogen Ribbon, *Physical Review X*, Vol. 6, pp. 041030, 2016. Impact factor: 14.417.
- A. Picciotto, D. Margarone, A. Velyhan, P. Bellutti, J. Krasa, A. Szydłowski, G. Bertuccio, Y. Shi, A. Mangione, J. Prokupek, A. Malinowska, E. Krousky, J. Ullschmied, L. Laska, M. Kucharik and G. Korn, Boron-Proton Nuclear-Fusion Enhancement Induced in Boron-Doped Silicon Targets by Low-Contrast Pulsed Laser, *Physical Review X*, Vol. 4, pp. 031030, 2014. Impact factor: 14.417.
- M. Kucharik, M. Shashkov, Conservative Multi-Material Remap for Staggered Multi-Material Arbitrary Lagrangian-Eulerian Methods, *Journal of Computational Physics*, Vol. 258, pp. 268-304, 2014. Impact factor: 4.645.

Co-author of about 80 publications in international scientific journals and proceedings of international conferences (61 currently indexed in WoS). Author of about 45 presentations at international conferences (2 invited presentations). 877 citations in WoS (518 without self-citations), H-index: 15 (11 without self-citations).

**International Collaboration:**

- T-5 and XCP4 Groups, LANL, Los Alamos, NM, USA: Dr. Shashkov, Prof. Wendroff, Dr. Berndt, Dr. Garimella – all aspects of numerical fluid/continuum simulations;
- CNRS/Bordeaux University, France: Dr. Loubère – material/viscosity models, numerical methods in cylindrical geometry, function reconstructions;
- CEA/CELIA/Bordeaux University, France: Dr. Breil, Dr. Maire – remapping methods;
- IPPLM, Warsaw, Poland: Prof. Badziak – all aspects of laser/plasma interactions;

**Grant projects:**

- Principal investigator of 2 internal university grants, 1 Czech Ministry of Education grant, and 1 Czech Science Foundation grant.
- Co-principal investigator of 1 Czech Science Foundation grant.
- Team member in many research projects (Czech Science Foundation, Czech Ministry of Education, EGIDE, EUROfusion, ...)

**Educational Activities:**

**Since 2002** Teaching of various courses at the Czech Technical University in Prague (Practical Informatics, Numerical Methods, Methods of Computational Physics).

**Since 2009** Supervisor of 6 undergraduate and 2 PhD students, co-advisor of 1 PhD student.