

## Personal information

CONTACT INFORMATION	Institute of Mathematics of the Czech Academy of Sciences Žitná 25 115 67 Prague 1 Czech Republic	(+420) 222 090 710 (office) sistek@math.cas.cz <a href="http://users.math.cas.cz/~sistek">http://users.math.cas.cz/~sistek</a>
RESEARCH INTERESTS	<p><b>Numerical Analysis:</b> numerical solution of partial differential equations, numerical linear algebra, domain decomposition methods, finite element method.</p> <p><b>Computational Fluid Dynamics:</b> incompressible viscous flow simulations, vortex identification methods, parallel solvers for CFD.</p> <p><b>Programming:</b> high-performance computing, task-based programming.</p>	
EDUCATION	<p><b>Ph.D.</b> (2008) Czech Technical University in Prague (Czech Republic) Faculty of Mechanical Engineering, Department of Mathematics Dissertation title: <i>The finite element method in fluids: stabilization and domain decomposition</i>, advisor Pavel Burda</p> <p><b>Ing.</b> (MSc equivalent) (2005) Czech Technical University in Prague (Czech Republic) Faculty of Mechanical Engineering, Department of Mathematics, with <i>summa cum laude</i> Thesis title: <i>Stabilization of finite element method for solving incompressible viscous flows</i>, advisor Pavel Burda</p>	
QUALIFICATIONS AND SOCIETY MEMBERSHIPS	<p><i>eu-maths-in.cz</i> — Czech Network for Mathematics in Industry treasurer (elected) 2015–present member 2014–present</p> <p><i>Society for Industrial and Applied Mathematics (SIAM)</i> member 2019–present</p> <p><i>Union of Czech Mathematicians and Physicists (JČMF) through the Czech Mathematical Society (ČMS)</i> member 2009–present</p>	
APPOINTMENTS	<p><i>Institute of Mathematics of the Czech Academy of Sciences, Prague (Czech Republic)</i> Research Fellow, Department of Constructive Methods of Math. Analysis 2013–present Postdoctoral Fellow, Department of Constructive Methods of Math. Analysis 2009–2012</p> <p><i>School of Mathematics, The University of Manchester (United Kingdom)</i> Research Fellow Jan 2018–Sep 2018 Research Associate Apr 2016–Dec 2017</p> <p><i>University of Cambridge, Department of Engineering (United Kingdom)</i> Research Associate Mar–Jul 2011, Dec 2011–Jan 2012</p> <p><i>University of Colorado Denver, Dept. of Mathematical &amp; Statistical Sciences (USA)</i> Research Assistant Sep–Dec 2007, Feb–May 2009</p> <p><i>Institute of New Technologies and Applied Informatics, Technical University of Liberec</i> Research Assistant (part-time) 2010–2016</p> <p><i>Aeronautical Research and Test Institute, Prague</i> Research Assistant at the Dept. of Low Speed Aerodynamics (part-time) 2006–2009</p> <p><i>Institute of Thermomechanics of the Academy of Sciences of the Czech Republic, Prague</i> Research Assistant (part-time) 2005–2009</p> <p><i>Czech Technical University in Prague, Faculty of Mechanical Engineering</i> Teaching Assistant at the Department of Mathematics (part-time) 2003–2014</p>	

University of Colorado Denver, Dept. of Mathematical & Statistical Sciences (USA)  
Visiting Researcher (with Prof Mandel) Sep–Oct 2012, Mar–May 2013, Feb 2014

CINECA Supercomputing Centre, Bologna (Italy)  
Visiting Researcher (within HPC Europa 2 project) Sep–Nov 2010

Edinburgh Parallel Computing Centre (United Kingdom)  
Visiting Researcher (within HPC Europa project) Sep–Dec 2005

## Research contributions

Author or co-author of 19 papers in peer-reviewed journals, 23 papers in peer-reviewed conference proceedings, and co-editor of 10 books of peer-reviewed conference proceedings.

### Peer-reviewed journal papers

1. Dongarra, J., Gates, M., Haidar, A., Kurzak, J., Luszczek, P., Wu, P., Yamazaki, I., YarKhan, A., Abalenkovs, M., Bagherpour, N., Hammarling, S., Šístek, J., Stevens, D., Zounon, M., and Relton, S. D. PLASMA: Parallel linear algebra software for multicore using OpenMP. *ACM Transactions on Mathematical Software* (2019). To appear.
2. Šístek, J., and Kolář, V. Vortex and the balance between vorticity and strain rate. *International Journal of Aerospace Engineering* (2019). To appear.
3. Šístek, J., and Kolář, V. Average contra-rotation and co-rotation of line segments for flow field analysis. *Journal of Physics: Conference Series* 822, 1 (2017), 012070.
4. Kùs, P., and Šístek, J. Coupling parallel adaptive mesh refinement with a nonoverlapping domain decomposition solver. *Adv. Eng. Softw.* 110 (2017), 34–54.
5. Šístek, J., Březina, J., and Sousedík, B. BDDC for mixed-hybrid formulation of flow in porous media with combined mesh dimensions. *Numer. Linear Algebra Appl.* 22, 6 (2015), 903–929.
6. Šístek, J., and Cirak, F. Parallel iterative solution of the incompressible Navier-Stokes equations with application to rotating wings. *Comput. & Fluids* 122 (2015), 165–183.
7. Kolář, V., and Šístek, J. Corotational and compressibility aspects leading to a modification of the vortex-identification  $Q$ -criterion. *AIAA Journal* 53, 8 (2015), 2406–2410.
8. Kolář, V., Šístek, J., Cirak, F., and Moses, P. Average corotation of line segments near a point and vortex identification. *AIAA Journal* 51, 11 (2013), 2678–2694.
9. Sousedík, B., Šístek, J., and Mandel, J. Adaptive-Multilevel BDDC and its parallel implementation. *Computing* 95, 12 (2013), 1087–1119.
10. Šístek, J., Čertíková, M., Burda, P., and Novotný, J. Face-based selection of corners in 3D substructuring. *Math. Comput. Simulation* 82, 10 (2012), 1799–1811.
11. Mandel, J., Sousedík, B., and Šístek, J. Adaptive BDDC in three dimensions. *Math. Comput. Simulation* 82, 10 (2012), 1812–1831.
12. Šístek, J., Sousedík, B., Burda, P., Mandel, J., and Novotný, J. Application of the parallel BDDC preconditioner to the Stokes flow. *Comput. & Fluids* 46 (2011), 429–435.
13. Hájek, J., Szöllös, A., and Šístek, J. A new mechanism for maintaining diversity of Pareto archive in multiobjective optimization. *Adv. Eng. Softw.* 41, 7–8 (2010), 1031–1057.
14. Šístek, J., Novotný, J., Mandel, J., Čertíková, M., and Burda, P. BDDC by a frontal solver and stress computation in a hip joint replacement. *Math. Comput. Simulation* 80, 6 (2010), 1310–1323.
15. Burda, P., Novotný, J., and Šístek, J. Accuracy of semiGLS stabilization of FEM for solving Navier–Stokes equations and a posteriori error estimates. *Internat. J. Numer. Methods Fluids* 56, 8 (2008), 1167–1173.
16. Burda, P., Novotný, J., and Šístek, J. Numerical solution of flow problems by stabilized finite element method and verification of its accuracy using a posteriori error estimates. *Math. Comput. Simulation* 76, 1–3 (2007), 28–33.
17. Burda, P., Novotný, J., and Šístek, J. Finite element solution of Navier-Stokes equations adapted to a priori error estimates. *WSEAS Trans. Math.* 5, 1 (2006), 188–195.
18. Burda, P., Novotný, J., and Šístek, J. On a modification of GLS stabilized FEM for solving incompressible viscous flows. *Internat. J. Numer. Methods Fluids* 51, 9–10 (2006), 1001–1016.
19. Burda, P., Novotný, J., and Šístek, J. Precise FEM solution of a corner singularity using an adjusted mesh. *Internat. J. Numer. Methods Fluids* 47, 10–11 (2005), 1285–1292.

## Peer-reviewed conference proceedings papers

1. Hanek, M., Šístek, J., Burda, P., and Stach, E. Parallel domain decomposition solver for flows in hydrostatic bearings. In *Proceedings of Topical Problems of Fluid Mechanics 2018, Prague, Czech Republic, February 21–23, 2018*, D. Šimurda and T. Bodnár, Eds. Institute of Thermomechanics AS CR, 2018, pp. 137–144.
2. Hanek, M., Šístek, J., and Burda, P. The effect of irregular interfaces on the BDDC method for the Navier-Stokes equations. In *Domain Decomposition Methods in Science and Engineering XXIII, Lecture Notes in Computational Science and Engineering*, C.-O. Lee, X.-C. Cai, D. Keyes, H. Kim, A. Klawonn, E.-J. Park, and O. Widlund, Eds. Springer, 2017, pp. 171–178.
3. Šístek, J. A parallel finite element solver for unsteady incompressible Navier-Stokes equations. In *Proceedings of Topical Problems of Fluid Mechanics 2015, Prague, Czech Republic, February 11–13, 2015*, D. Šimurda and T. Bodnár, Eds. Institute of Thermomechanics AS CR, 2015, pp. 193–198.
4. Hanek, M., Šístek, J., and Burda, P. An application of the BDDC method to the Navier-Stokes equations in 3-D cavity. In *Proceedings of Programs and Algorithms of Numerical Mathematics 17, Dolní Maxov, Czech Republic, June 8–13, 2014*, J. Chleboun, P. Přikryl, K. Segeth, J. Šístek, and T. Vejchodský, Eds. Institute of Mathematics AS CR, 2015, pp. 77–85.
5. Čertíková, M., Šístek, J., and Burda, P. Different approaches to interface weights in the BDDC method in 3D. In *Proceedings of Programs and Algorithms of Numerical Mathematics 17, Dolní Maxov, Czech Republic, June 8–13, 2014*, J. Chleboun, P. Přikryl, K. Segeth, J. Šístek, and T. Vejchodský, Eds. Institute of Mathematics AS CR, 2015, pp. 47–57.
6. Kolář, V., and Šístek, J. Recent progress in explicit shear-eliminating vortex identification. In *Proceedings of 19th Australasian Fluid Mechanics Conference, Melbourne, Australia, December 8–11, 2014*, H. Chowdhury and F. Alam, Eds. RMIT University, 2014. Article no. 274.
7. Šístek, J., Mandel, J., Sousedík, B., and Burda, P. Parallel implementation of Multilevel BDDC. In *Numerical Mathematics and Advanced Applications 2011 (Proceedings of ENUMATH 2011)*, A. Cangiani et al., Eds. Springer, 2013, pp. 681–689.
8. Šístek, J., Kolář, V., Cirak, F., and Moses, P. Fluid-Structure Interaction and Vortex Identification. In *Proceedings of the Eighteenth AUSTRALASIAN FLUID MECHANICS CONFERENCE*, Brandner, P.A. and Pearce, B.W., Eds. Australasian Fluid Mechanics Society 2012. Paper no. 125.
9. Šístek, J., Mandel, J., and Sousedík, B. Some practical aspects of parallel adaptive BDDC method. In *Proceedings of Applications of Mathematics 2012*, J. Brandts, J. Chleboun, S. Korotov, K. Segeth, J. Šístek, and T. Vejchodský, Eds. Institute of Mathematics AS CR, 2012, pp. 253–266.
10. Čertíková, M., Burda, P., and Šístek, J. Numerical comparison of different choices of interface weights in the BDDC method. In *Proceedings of Applications of Mathematics 2012*, J. Brandts, J. Chleboun, S. Korotov, K. Segeth, J. Šístek, and T. Vejchodský, Eds. Institute of Mathematics AS CR, 2012, pp. 55–61.
11. Burda, P., Novotný, J., and Šístek, J. Analytical solution of Stokes flow near corners and applications to numerical solution of Navier-Stokes equations with high precision. In *Proceedings of Applications of Mathematics 2012*, J. Brandts, J. Chleboun, S. Korotov, K. Segeth, J. Šístek, and T. Vejchodský, Eds. Institute of Mathematics AS CR, 2012, pp. 43–54.
12. Burda, P., Novotný, J., and Šístek, J. Singularities in lid driven cavity solved by adjusted finite element method. In *Computational Fluid Dynamics 2010, Proceedings of 6th ICCFD Conference, St. Petersburg, Russia, July 12–16, 2010*, A. Kuzmin, Ed. Springer, 2011, pp. 799–805.
13. Kolář, V., Moses, P., and Šístek, J. Triple Decomposition Method for Vortex Identification in Two-Dimensional and Three-Dimensional Flows. In *Computational Fluid Dynamics 2010, Proceedings of 6th ICCFD Conference, St. Petersburg, Russia, July 12–16, 2010*, A. Kuzmin, Ed. Springer, 2011, pp. 225–231.
14. Šístek, J., Burda, P., Mandel, J., Novotný, J., and Sousedík, B. A parallel implementation of the BDDC for the Stokes flow. In *Computational Fluid Dynamics 2010, Proceedings of 6th ICCFD Conference, St. Petersburg, Russia, July 12–16, 2010*, A. Kuzmin, Ed. Springer, 2011, pp. 806–812.
15. Čertíková, M., Burda, P., Novotný, J., and Šístek, J. Some remarks on averaging in the BDDC method. In *Proceedings of Programs and Algorithms of Numerical Mathematics 15, Dolní Maxov, Czech Republic, June 6–11, 2010*, T. Vejchodský et al., Eds. Institute of Mathematics AS CR, Praha, 2010, pp. 28–34.

16. Šístek, J., Burda, P., Mandel, J., Novotný, J., and Sousedík, B. On a parallel implementation of the BDDC method and its application to the Stokes problem. In *Parallel Computational Fluid Dynamics, Recent Advances and Future Directions*, R. Biswas, Ed. DEStech Publications, Lancaster, USA, 2010, pp. 289–296.
17. Burda, P., Novotný, J., and Šístek, J. Accuracy Analysis Based on A Posteriori Error Estimates of SemiGLS Stabilization of FEM for Solving Navier-Stokes Equations. In *Computational Fluid Dynamics 2008, Proceedings of 5th ICCFD Conference, Seoul, South Korea, July 7–11, 2008*, H. Choi, and J. Yoo, Eds. Springer, 2009, pp. 315–320.
18. Burda, P., Novotný, J., and Šístek, J. Semi-GLS stabilization of FEM applied to incompressible flows with higher Reynolds numbers. In *Computational Fluid Dynamics 2006, Proceedings of 4th ICCFD Conference, Ghent, Belgium, July 10–14, 2006*, H. Deconinck and E. Dick, Eds. Springer, 2009, pp. 203–208.
19. Šístek, J., Burda, P., Čertíková, M., and Novotný, J. On Construction of The Coarse Space in the BDDC Method. In *Proceedings of Programs and Algorithms of Numerical Mathematics 14, Dolní Maxov, Czech Republic, June 1–6, 2008*, J. Chleboun et al., Eds. Institute of Mathematics AS CR, Praha, 2008, pp. 177–184.
20. Burda, P., Novotný, J., and Šístek, J. Accuracy investigation of a stabilized FEM for solving flows of incompressible fluid. In *Proceedings of Programs and Algorithms of Numerical Mathematics 13, Praha, Czech Republic, May 28–31, 2006*, J. Chleboun et al., Eds. Institute of Mathematics AS CR, Praha, 2006, pp. 30–36.
21. Burda, P., Novotný, J., Sousedík, B., and Šístek, J. Finite element mesh adjusted to singularities applied to axisymmetric and plane flow. In *Proceedings of Numerical Mathematics and Advanced Applications (ENUMATH), Praha, Czech Republic, August 18–22, 2003*, M. Feistauer et al., Eds. Springer, Berlin, 2004, pp. 186–195.
22. Burda, P., Novotný, J., and Šístek, J. Accurate solution of corner singularities in axisymmetric and plane flows using adjusted mesh of finite elements. In *Computational Fluid Dynamics 2006, Proceedings of 3rd ICCFD Conference, Toronto, Canada, July 12–16, 2006*, C. Groth and D. W. Zingg, Eds. Springer, 2004, pp. 463–468.
23. Burda, P., Novotný, J., Sousedík, B., and Šístek, J. A priori and a posteriori error estimates for Navier-Stokes equations applied to incompressible flows. In *Proceedings of Programs and Algorithms of Numerical Mathematics 12, Dolní Maxov, Czech Republic, June 6–11, 2004*, J. Chleboun et al., Eds. Institute of Mathematics AS CR, Praha, 2004, pp. 24–33.

#### Peer-reviewed edited books of proceedings

1. Chleboun, J., Kůs, P., Příkryl, P., Rozložník, M., Segeth, K., Šístek, J., and Vejchodský, T., Eds. *Proceedings of Seminar Programs and Algorithms of Numerical Mathematics 19* (Prague, 2019), Institute of Mathematics, Czech Academy of Sciences.
2. Kozubek, T., Čermák, M., Tichý, P., Blaheta, R., Šístek, J., Lukáš, D., and Jaroš, J., Eds. *High Performance Computing in Science and Engineering, Third International Conference HPCSE 2017, Karolinka, Czech Republic, May 22–25, 2017* (2018), Lecture Notes in Computer Science, Springer.
3. Chleboun, J., Kůs, P., Příkryl, P., Segeth, K., Šístek, J., and Vejchodský, T., Eds. *Proceedings of Seminar Programs and Algorithms of Numerical Mathematics 18* (Prague, 2017), Institute of Mathematics, Czech Academy of Sciences.
4. Kozubek, T., Blaheta, R., Šístek, J., Rozložník, M., and Čermák, M., Eds. *High Performance Computing in Science and Engineering, Second International Conference HPCSE 2015, Soláň, Czech Republic, May 25–28, 2015* (2016), Lecture Notes in Computer Science, Springer.
5. Brandts, J., Korotov, S., Křížek, M., Segeth, K., Šístek, J., and Vejchodský, T., Eds. *Proceedings of the International Conference Applications of Mathematics 2015, in honor of the birthday anniversaries of Ivo Babuška, (90), Milan Práger (85), and Emil Vitásek (85)* (Prague, 2015), Institute of Mathematics, Czech Academy of Sciences.
6. Chleboun, J., Příkryl, P., Segeth, K., Šístek, J., and Vejchodský, T., Eds. *Proceedings of Seminar Programs and Algorithms of Numerical Mathematics 17* (Prague, 2015), Institute of Mathematics, Czech Academy of Sciences.
7. Brandts, J., Korotov, S., Křížek, M., Šístek, J., and Vejchodský, T., Eds. *Proceedings of the International Conference Applications of Mathematics 2013, in honor of the 70th birthday of Karel Segeth* (Prague, 2013), Institute of Mathematics, Academy of Sciences of the Czech Republic.
8. Chleboun, J., Segeth, K., Šístek, J., and Vejchodský, T., Eds. *Proceedings of Seminar Programs and Algorithms of Numerical Mathematics 16* (Prague, 2013), Institute of Mathematics, Academy of Sciences of the Czech Republic.

9. Brandts, J., Chleboun, J., Korotov, S., Segeth, K., Šístek, J., and Vejchodský, T., Eds. *Proceedings of the International Conference Applications of Mathematics 2012, in honor of the 60th birthday of Michal Křížek* (Prague, 2012), Institute of Mathematics, Academy of Sciences of the Czech Republic.
10. Vejchodský, T., Chleboun, J., Příklad, P., Segeth, K., and Šístek, J., Eds. *Proceedings of Seminar Programs and Algorithms of Numerical Mathematics 15* (Prague, 2010), Institute of Mathematics, Academy of Sciences of the Czech Republic.

PARTICIPATION IN  
INTERNATIONAL  
RESEARCH PROJECTS

INTERTWinE, Programming Model INTERoperability ToWards Exascale, coordinator: University of Edinburgh, role: team member at the University of Manchester, awarded by European Commission under the FETHPC programme Oct 2015–Sep 2018

HIGHERFLY, Immersed methods for insect flight aerodynamics, coordinator: University of Cambridge, role: coinvestigator, awarded by PRACE infrastructure under DECI programme May 2013–Jul 2014

HIFLY, Direct numerical simulation of flows occurring in insect flight, coordinator: University of Cambridge, role: coinvestigator, awarded by PRACE infrastructure under DECI programme Nov 2011–Oct 2012

PARTICIPATION IN  
NATIONAL RESEARCH  
PROJECTS

GAČR 18-09628S, Advanced flow-field analysis, coordinator: Institute of Hydrodynamics of CAS, role: principal coinvestigator, awarded by Czech Science Foundation 2018–2020

High-resolution flow simulations for vortex identification, coordinator: Institute of Mathematics CAS, role: principal investigator, computing time awarded by IT4Innovations Sep 2018–June 2019

GAČR 14-02067S, Advanced methods for flow-field analysis, coordinator: Institute of Hydrodynamics of CAS, role: principal coinvestigator, awarded by Czech Science Foundation 2014–2016

Multilevel Domain Decomposition Solvers for Incompressible Flows, coordinator: Institute of Mathematics CAS, role: principal investigator, computing time awarded by IT4Innovations Dec 2015–Aug 2016

Domain Decomposition Solvers for Incompressible Flows, coordinator: Institute of Mathematics CAS, role: principal investigator, computing time awarded by IT4Innovations Jan–Sep 2015

Scalable Solvers for Subsurface Flow Simulations, coordinator: Institute of Mathematics CAS, role: principal investigator, computing time awarded by IT4Innovations Jun–Dec 2013

LH11004, Domain Decomposition Methods, coordinator: Czech Technical University in Prague, role: team member, awarded by AMVIS–MŠMT 2011–2014

EP/G008531/1, Computational Toolbox for Fluid-Membrane Interaction with Applications to Micro Air Vehicles and Insect Flight, coordinator: University of Cambridge, role: team member, awarded by EPSRC 2009–2012

DMS-0713876, Adaptive Multilevel Iterative Substructuring Methods, coordinator: University of Colorado Denver, role: team member, awarded by NSF 2007–2010

## CITATIONS

151 (h-index 7) according to *Web of Science*, 172 (h-index 8) according to *Scopus*, and 354 (h-index 10) according to *Google Scholar*.

PRESENTATIONS AT  
INTERNATIONAL  
CONFERENCES

1. A domain decomposition solver for parallel adaptive mesh refinement. *Seminar on Numerical Analysis 2019*. Ostrava, Czech Republic, January 21–25, 2019.
2. Combining Adaptive Mesh Refinement with a Parallel Multilevel BDDC Solver. *Computational Mechanics 2018*. Srní, Czech Republic, October 31 – November 2, 2018.
3. Introducing Distributed Memory Task-based Programming to the PLASMA Numerical Library. *Applications of Mathematics 2018*. Prague, Czech Republic, August 22–25, 2018.
4. OpenMP Tasks for QR Factorization in PLASMA. *SIAM Parallel Processing for Scientific Computing 2018*. Waseda University, Tokyo, Japan, March 7–10, 2018.
5. Using OpenMP tasks for QR factorization in the PLASMA library. *High Performance Computing in Science and Engineering (HPCSE) 2017*. Hotel Soláň, Czech Republic, May 22–25, 2017.
6. Combining adaptive mesh refinement with a parallel multilevel BDDC solver. *International Conference on Domain Decomposition Methods, DD XXIV*. Longyearbyen, Svalbard, Norway, February 6–10, 2017. **Invited minisymposium talk.**
7. Effect of adaptive mesh refinement on a parallel non-overlapping domain decomposition solver. *ECCOMAS Congress 2016*. Crete Island, Greece, June 5–10, 2016. **Invited minisymposium talk.**
8. On application of the parallel BDDC method to incompressible flows. *IMA Conference on Numerical Methods for Simulation*. Oxford, UK, September 1–4, 2015.
9. Parallel Implementation of BDDC for Mixed-Hybrid Formulation of Flow in Porous Media. *International Conference on Domain Decomposition Methods, DD XXIII*. Jeju Island, Korea, July 6–10, 2015. **Invited minisymposium talk.**
10. Parallel performance of iterative solvers for pressure-correction methods for incompressible flows. *High Performance Computing in Science and Engineering (HPCSE) 2015*. Hotel Soláň, Czech Republic, May 25–28, 2015.
11. Balancing domain decomposition methods. *Seminar on Numerical Analysis, SNA'15*. Institute of Geonics, Ostrava, Czech Republic, January 19–23, 2015. **Invited plenary talk.**
12. Parallel Adaptive-Multilevel BDDC. *WCCM XI – ECCM V – ECFD VI 2014*. Barcelona, Spain, July 20–25, 2014. **Invited minisymposium talk.**
13. Parallel Adaptive-Multilevel BDDC. *Parallel Matrix Algorithms and Applications (PMAA) 2014*. Lugano, Switzerland, July 2–4, 2014. **Invited minisymposium talk.**
14. Parallel implementation of Adaptive-Multilevel BDDC method and applications to linear elasticity. *SPOMECH Workshop 2013*. VŠB-TU Ostrava, Czech Republic, November 13–15, 2013. **Invited plenary talk.**
15. Parallel performance of iterative solvers for pressure-correction methods. *SPOMECH Autumn School 2012*. VŠB-TU Ostrava, Czech Republic, November 20, 2012. **Invited plenary talk.**
16. Application of Multilevel BDDC Method to Elasticity Analysis. *European Seminar on Computing (ESCO)*. Plzeň, Czech Republic, June 25–29, 2012.
17. Primal methods of iterative substructuring. *Programs and Algorithms of Numerical Mathematics 16*. Dolní Maxov, Czech Republic, June 3–8, 2012. **Invited plenary talk.**
18. Parallel Adaptive BDDC Method. *Applications of Mathematics*. Prague, Czech Republic, May 2–5, 2012.
19. Parallel Implementation of Multilevel BDDC Method. *European Numerical Mathematics and Advanced Applications (ENUMATH)*. Leicester, UK, September 5–9, 2011.
20. A Parallel Implementation of the BDDC Method for the Stokes Flow. *The Sixth International Conference on Computational Fluid Dynamics (ICCFD)*. St. Petersburg, Russia, July 12–16, 2010.
21. A Parallel Implementation of the BDDC method for Linear Elasticity. *MAFELAP 2009*, London, UK, June 9–12, 2009.
22. Parallel Implementation of the BDDC method. *21st International Conference on Parallel Computational Fluid Dynamics (ParCFD)*, Moffet Field, California, USA, May 18–22, 2009.

23. A posteriori error estimates in accuracy analysis of stabilized FEM. *4-th Conference on Superconvergence Phenomena in the Finite Element Method*, Prague, Czech Republic, June 25–28, 2008.
24. Accuracy investigation of stabilized FEM for flow problems. *MAFELAP 2006*, London, UK, June 13–16, 2006.
25. Galerkin Least Squares stabilization of FEM for solving incompressible viscous flows. *FEF05 - Thirteenth Conference on Finite Elements for Flow Problems*, Swansea, Wales, UK, April 4–6, 2005.

PRESENTATIONS AT  
INSTITUTIONS AND  
SEMINARS

1. PLASMA INTERTWinING, *Innovative Computing Lab, The University of Tennessee*, September 21, 2018.
2. OpenMP Tasks for QR Factorization in PLASMA, *The University of Manchester*, February 27, 2018.
3. Combining adaptive mesh refinement with a parallel multilevel BDDC solver, *The University of Manchester*, May 16, 2017.
4. Some recent advances of nonoverlapping domain decomposition methods, *The University of Manchester*, November 15, 2016.
5. Parallel Adaptive-Multilevel BDDC, *Charles University, Prague*, October 30, 2014.
6. Parallel Adaptive-Multilevel BDDC, *Czech Technical University in Prague*, October 15, 2014.
7. Balancing Domain Decomposition by Constraints and its applications to incompressible flows, *VŠB–Technical University of Ostrava*, September 11, 2014.
8. BDDC for mixed-hybrid formulation of flow in porous media with combined mesh dimensions, *University of Colorado Denver*, February 25, 2014.
9. Parallel Adaptive-Multilevel BDDC, *Los Alamos National Laboratory, USA*, February 12, 2014.
10. Efficient solution methods for modelling of flows around insect wings, *Charles University, Prague*, December 2, 2013.
11. Efficient solution methods for modelling of flows around insect wings, *Charles University, Prague*, October 31, 2013.
12. Parallel implementation of Adaptive-Multilevel BDDC, *Stanford University, USA*, April 4, 2013.
13. Parallel implementation of Adaptive-Multilevel BDDC Method, *University of West Bohemia Pilsen*, November 15, 2012.
14. Parallel implementation of Adaptive-Multilevel BDDC Method, *University of Colorado Denver*, October 9, 2012.
15. Parallel implementation of Multilevel BDDC Method, *Technische Universität Dresden*, December 20, 2011.
16. Parallel implementation of Multilevel BDDC Method, *VŠB–Technical University of Ostrava*, November 15, 2011.
17. Parallel implementation of some Domain Decomposition Methods, *University of Cambridge*, November 29, 2010.
18. Parallel Implementation of some Domain Decomposition Methods, *CINECA, Bologna, Italy*, September 30, 2010.
19. Parallel implementation of the BDDC method, *University of Colorado Denver*, May 6, 2009.
20. On parallel implementation of BDDC using multifrontal solver MUMPS, *University of Colorado Denver*, December 10, 2007.

PRESENTATIONS FOR  
INDUSTRY

1. Vortex identification by average corotation of line segments near a point, *Techsoft Engineering, s.r.o.*, Prague, Czech Republic, February 2, 2016.
2. Exascale solvers for PDE-based simulations, *Škoda Auto, a.s.*, Mladá Boleslav, Czech Republic, October 21, 2014.

HONOURS	<p><i>Otto Wichterle Premium</i> 2013 (awarded annually by the Czech Academy of Sciences to promising young researchers)</p> <p><i>Professor Babuška Prize for an important contribution to computer science</i> 2009 (awarded jointly by the Union of Czech Mathematicians and Physicists and the Czech Society for Mechanics for the best doctoral dissertation of the year)</p> <p><i>Professor Zvoníček foundation award</i> 2009 (awarded by the Faculty of Mechanical Engineering, Czech Technical University in Prague for the best doctoral dissertation in theoretical disciplines of the year)</p> <p><i>Professor Babuška Honour for Master thesis</i> 2005 (awarded jointly by the Union of Czech Mathematicians and Physicists and the Czech Society for Mechanics for selected Master theses of the year)</p> <p><i>Karel Spála Prize</i> 2005 (awarded by the Faculty of Mechanical Engineering, Czech Technical University in Prague for the best Master thesis in theoretical disciplines of the year)</p>
SOFTWARE	<p><b>Parallel Linear Algebra Software for Multicore Architectures (PLASMA)</b> An open-source software package for solving problems in dense linear algebra using multicore processors. Package developed at Innovative Computing Laboratory (University of Tennessee) and School of Mathematics (The University of Manchester). Written in C with task-dependent framework of OpenMP 4.0. Member of the development team at the University of Manchester. <a href="https://bitbucket.org/icl/plasma">https://bitbucket.org/icl/plasma</a> 2016–2018</p> <p><b>BDDCML</b> An open-source massively parallel library for solving large systems of equations with sparse matrices by the <i>Adaptive-Multilevel BDDC method</i>. Written in Fortran 95 with MPI. Tested on up to 65 thousand processor cores. About 10 external users. Main developer. <a href="http://users.math.cas.cz/~sistek/software/bddcml.html">http://users.math.cas.cz/~sistek/software/bddcml.html</a> 2007–present</p> <p><b>Vortex Analysis Library (VALIB)</b> An open-source collection of routines for vortex identification and visualization based on region-type methods. Written in C, CUDA and OpenCL. Main developer. <a href="http://users.math.cas.cz/~sistek/software/valib/">http://users.math.cas.cz/~sistek/software/valib/</a> 2009–present</p>
SUPERVISION OF RESEARCH STUDENTS	Czech Technical University in Prague: 2 Bc students (2012, 2015), 1 MSc student (2014), 1 PhD student (since 2014).

## Other evidence of academic and professional standing

OTHER PUBLIC SERVICE IN A PROFESSIONAL CAPACITY	<p><b>Reviewer</b> for scientific journals <i>Journal of Computational Science,</i> <i>Computers and Mathematics with Applications,</i> <i>International Journal for Uncertainty Quantification,</i> <i>Applications of Mathematics,</i> <i>SIAM Journal on Scientific Computing,</i> <i>International Journal for Numerical Methods in Fluids,</i> <i>Journal of Scientific Computing,</i> <i>Mathematics and Computers in Simulation,</i> <i>Applied Mathematics and Computation,</i> <i>Engineering with Computers,</i> <i>Czechoslovak Mathematical Journal.</i></p> <p><b>Reviewer</b> for funding bodies PRACE — External expert of PRACE research infrastructure for evaluating applications for computing time on the largest European (Tier-0) supercomputers (reviewer, panel member) 2013–present</p> <p>Czech Technical University — reviewer for Student Grant Competition 2014–present</p> <p>Grant Agency of the Charles University in Prague — reviewer for Student Grant Competition 2014</p> <p><b>Coorganiser of a weekly seminar</b> <i>Current Problems in Numerical Analysis</i> (Institute of Mathematics CAS) since 2013.</p> <p><b>Steering committee member</b> for the doctoral study programme <i>Computational and Applied Mathematics</i> (VSB Technical University of Ostrava), since 2019.</p>
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**Lecturer** of a two-day course *PLASMA and MAGMA software libraries for numerical linear algebra*, 10–11/9/2018, IT4Innovations National Supercomputing Center, Ostrava, Czech Republic, jointly with Piotr Luszczek (ICL UTK).

**Mentor** in the *AMathNet* project for knowledge transfer within applied mathematics one week student interships in the Institute of Mathematics CAS (2014, 2013).

ORGANISATION ROLES  
AT CONFERENCES **Scientific committees of**

*High Performance Computing in Science and Engineering HPCSE (2019, 2017, 2015), European School on Mathematical Modelling, Numerical Analysis and Scientific Computing at Kácov (2018, 2016).*

**Organizing committees of**

*Programs and Algorithms of Numerical Mathematics (2018, 2016, 2014, 2012, 2010), Applications of Mathematics (2018, 2015, 2013, 2012), European exascale applications workshop, Manchester, UK, October 11–12, 2016, EQUADIFF 2013.*

**Minisymposium organizer at**

*Modelling 2019 (Olomouc, Czech Republic), DD23 (Jeju Island, Korea, 2015), MAFELAP 2009 (London, UK).*

## Teaching and learning

TEACHING  
EXPERIENCE

The University of Manchester, United Kingdom Department of Mathematics Courses: <i>Mathematics 1E2, Mathematics 2M1, Mathematics 0F2</i> (tutorials)	2017–2018
University of West Bohemia, Pilsen, Czech Republic Faculty of Applied Sciences, Department of Mathematics Courses: <i>Domain Decomposition Methods</i> (lectures)	2015–2016
Czech Technical University in Prague, Czech Republic Faculty of Mechanical Engineering, Department of Mathematics Courses: <i>Calculus, Numerical Analysis, Algorithmization and Programming</i> (lectures, tutorials)	2006–2014

## Outreach and public engagement

OUTREACH AND  
PUBLIC ENGAGEMENT

**Science popularisation** talk *Simulations, Supercomputers, ... and Mathematics* presented at *Open Doors Day of the Institute of Mathematics CAS* (2018, 2015, 2014, 2013), *Week of Science and Technology* at the Czech Academy of Sciences (2014, 2013).