Lubomír Bureš

Publications

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Research focuses on computational modelling of physics problems and engineering systems, ranging from microscale phase-change phenomena to molten-salt reactor dynamics.

For non-first-author publications, the CRediT author statement is used to indicate my contribution. The three most important publications are highlighted.

Publications in peer-reviewed scientific journals

- **Bureš, L.** (2025). Comparison of analytical models for frequency response and linear stability of molten salt reactors. *Nuclear Science and Engineering*, 1–24.
  DOI: doi.org/10.1080/00295639.2025.2460318
- **Bureš, L.**, Bucci, M., Sato, Y., & Bucci, M. (2024). A coarse grid approach for single bubble boiling simulations with the volume of fluid method. *Computers & Fluids*, 271, 106182.
  DOI: doi.org/10.1016/j.compfluid.2024.106182
- Fischer, L., & **Bureš, L.** (2024). Application of Modelica/TRANSFORM to system modeling of the molten salt reactor experiment. *Nuclear Engineering and Design*, 416, 112768.
  CRediT author statement: Conceptualization, Methodology, Software, Validation, Supervision, Writing – Review & Editing.
  DOI: doi.org/10.1016/j.nucengdes.2023.112768
- **Bureš, L.**, & Sato, Y. (2022). Comprehensive simulations of boiling with a resolved microlayer: Validation and sensitivity study. *Journal of Fluid Mechanics*, 933, A54.
  DOI: doi.org/10.1017/jfm.2021.1108
- Wong, K. W., **Bureš, L.**, & Mikityuk, K. (2021). Interface tracking investigation of the sliding bubbles effects on heat transfer in the laminar regime. *Nuclear Technology*, 208(8), 1266–1278.
  CRediT author statement: Conceptualization, Methodology, Supervision.
  DOI: doi.org/10.1080/00295450.2021.1971025
- **Bureš, L.**, & Sato, Y. (2021). On the modelling of the transition between contact-line and microlayer evaporation regimes in nucleate boiling. *Journal of Fluid Mechanics*, 916, A53.
  DOI: doi.org/10.1017/jfm.2021.204
- **Bureš, L.**, & Sato, Y. (2021). Direct numerical simulation of evaporation and condensation with the geometric VOF method and a sharp-interface phase-change model. *International Journal of Heat and Mass Transfer*, 173, 121233.
  DOI: doi.org/10.1016/j.ijheatmasstransfer.2021.121233
- **Bureš, L.**, Sato, Y., & Pautz, A. (2021). Piecewise linear interface-capturing volume-of-fluid method in axisymmetric cylindrical coordinates. *Journal of Computational Physics*, 436, 110291.
  DOI: doi.org/10.1016/j.jcp.2021.110291
- **Bureš, L.**, & Sato, Y. (2020). Direct numerical simulation of phase change in the presence of non-condensable gases. *International Journal of Heat and Mass Transfer*, 121, 119400.
  DOI: doi.org/10.1016/j.ijheatmasstransfer.2020.119400
- **Bureš, L.**, & Caruso, S. (2018). Acropolis: Novel approach to single-pin depletion calculations using stochastic optimisation. *Nuclear Science and Engineering*, 191(1), 66–84.
  DOI: doi.org/10.1080/00295639.2018.1442059

Peer-reviewed books/monographs

- **Bureš, L.** (2021). *Fundamental study on microlayer dynamics in nucleate boiling* (Doctoral dissertation). École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland.
  DOI: doi.org/10.5075/epfl-thesis-9856

Peer-reviewed conference proceedings

- **Bureš, L.**, & Nilsson, P. (2025). Impacts of internal heating on flow and temperature distribution in channels. In *Proceedings of 21st International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-21).*
  Preprint available at arXiv:2507.08515.

- **Bureš, L.** (2025). Role of recirculation in reactivity loss in circulating-fuel reactors. In *Proceedings of M&C 2025 — The International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering.*
  DOI: doi.org/10.13182/MC25-47000

- Ruscoe, T. A., Alatrash, Y., Fischer, L., **Bureš, L.**, & Elter, Zs. (2024). On flow distribution and heat transfer in a graphite moderated molten salt reactor. In *Proceedings of 14th International Topical Meeting on Nuclear Reactor Thermal-Hydraulics, Operation, and Safety (NUTHOS-14).*
  CRediT author statement: Methodology, Software, Writing – Review & Editing.
  DOI: doi.org/10.5281/zenodo.13972522

- **Bureš, L.** (2024). Effect of temperature recirculation on frequency response and stability of molten salt reactors. In *Proceedings of PHYSOR 2024 — The International Conference on Physics of Reactors.*
  DOI: doi.org/10.13182/PHYSOR24-43458

- Ponce Tovar, M., Fischer, L., & **Bureš, L.** (2024). On the impact of fuel velocity profile on the loss of delayed neutron precursors in the molten salt reactor experiment. In *Proceedings of PHYSOR 2024 — The International Conference on Physics of Reactors.*
  CRediT author statement: Conceptualization, Methodology, Writing – Review & Editing.
  DOI: doi.org/10.13182/PHYSOR24-43471

- **Bureš, L.**, Ponce Tovar, M., & Groth Jensen, J. (2023). Distributed-parameter linear stability analysis of a double-pass circulating-fuel reactor. In *Proceedings of M&C 2023 — The International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering.*
  DOI: doi.org/10.5281/zenodo.11196185

- Ponce Tovar, M., Vidal-Ferràndiz, A., **Bureš, L.**, Ginestar, D., & Groth Jensen, J. (2023). Investigation of neutron transport approximations and homogenization methods for a small molten salt reactor. In *Proceedings of M&C 2023 — The International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering.*
  CRediT author statement: Conceptualization, Methodology, Writing – Review & Editing.
  DOI: doi.org/10.5281/zenodo.12730861

- **Bureš, L.**, & Sato, Y. (2022). Computational study of force balance during nucleate boiling. In *Proceedings of the 7th Thermal and Fluids Engineering Conference (TFEC 2022).*
  Selected as a best paper.
  DOI: doi.org/10.1615/TFEC2022.mph.040736

- **Bureš, L.**, & Sato, Y. (2021). Analysis of dynamics of microlayer formation and destruction in nucleate boiling. In *Proceedings of the 5–6th Thermal and Fluids Engineering Conference (TFEC 2021).*
  DOI: doi.org/10.1615/TFEC2021.boi.036174

- **Bureš, L.**, & Sato, Y. (2021). Marker gradient method: Sharp and robust algorithm for interfacial area density calculation. In *Proceedings of the 5–6th Thermal and Fluids Engineering Conference (TFEC 2021).*
  DOI: doi.org/10.1615/TFEC2021.cmd.036173

- **Bureš, L.**, & Sato, Y. (2020). Sharp-interface phase-change model with the VOF method. In *Proceedings of the 5th Thermal and Fluids Engineering Conference (TFEC 2020).*
  DOI: doi.org/10.1615/TFEC2020.cmd.031939

- Wong, K. W., **Bureš, L.**, Nichenko, S., & Krepel, J. (2019). Direct numerical simulation of molten salt bubble growth with PSI-BOIL. In *Proceedings of the International Congress on Advances in Nuclear Power Plants (ICAPP 2019).*
  CRediT author statement: Conceptualization, Methodology, Writing – Review & Editing, Supervision.
  DOI: doi.org/10.5281/zenodo.3357902

Patents and licences

- **Bureš, L.**, Rodriguez Ruocco, I., & Schofield, A. V. (2025). *A method of operating a molten salt reactor* (International Patent Application WO 2025/190786 A1). Geneva, Switzerland: World Intellectual Property Organization.
  Link: patentscope.wipo.int/search/en/detail.jsf?docId=WO2025190786

Contributions to conferences

- **Bureš, L.** (2025). Challenges in modelling and simulation of thermal molten salt reactor transients: Industrial perspective.
  Invited panel speaker for the *Topical session on Challenges in Modelling and Simulation of Reactor Transients* at the *2025 OECD/NEA WPRS Benchmarks Workshops*, Cambridge, United Kingdom.
- **Bureš, L.** (2024). Seaborg Technologies: Computational R&D perspective.
  Invited panel speaker for the *Advancing Molten Salt Technology for the Next Generation of Nuclear Reactors* panel at the *2024 ANS Winter Conference and Expo*, Orlando, FL, United States.
- **Bureš, L.** (2024). Compact Molten Salt Reactor (CMSR) Power Barge: Progress & status.
  Invited speaker for the *Regional Workshop on Reactor Physics, System Thermal Hydraulics and Safety of Small Modular Reactors for Near-term Deployment*, Bandung, Indonesia (delivered online).
- Bureš, J., **Bureš, L.**, Bucci, M., & Bucci, M. (2022). Machine-learning prediction of microscopic bubble-growth characteristics.
  Presented at *ECCOMAS Congress 2022 — The 8th European Congress on Computational Methods in Applied Sciences and Engineering*, Oslo, Norway.
  CRediT author statement: Conceptualization, Methodology, Supervision.
- Yama, K., **Bureš, L.**, Sato, Y., & Yabuki, T. (2021). Microscale heat transport measurement of three-phase boundary line using stacked MEMS heat flux sensor (in Japanese).
  Presented at *The 12th Symposium on Micro-Nano Science and Technology* (online).
  CRediT author statement: Conceptualization, Methodology.
- **Bureš, L.**, & Sato, Y. (2019). New contact line region model for multi-scale analysis of nucleate boiling.
  Poster presentation at *SWEP2 — Surface Wettability Effects on Phase Change Phenomena workshop*, Mons, Belgium.
- **Bureš, L.** (2016). Application of calculation codes based on Monte Carlo method for benchmark experiments (in Czech).
  Poster presentation of bachelor's thesis at *16. Mikulášské setkání Mladé generace ČNS*, Brno, Czech Republic. Selected as best bachelor's thesis.