

Chapter 1

oomph-lib related Publications

Here is a list of publications resulting from (or produced with) `oomph-lib`. If you have produced any work with `oomph-lib` and would like it to be listed here, send us a URL (or an electronic version of the publication) and we will install a link to it.

- Diekmann, Jan, and Uwe Thiele. “Mesoscopic hydrodynamic model for spreading, sliding, and coarsening compound drops”. *Physical Review Fluids* 10 (2025): 024002. <https://doi.org/10.1103/physrevfluids.10.024002>.
- Hartmann, Simon, and Uwe Thiele. “Gradient dynamics model for drops of volatile liquid on a porous substrate”. *Physical Review Fluids* 10 (2025): 014003. <https://doi.org/10.1103/physrevfluids.10.014003>.
- Pietz, Anthony, Karin John, and Uwe Thiele. “The role of substrate mechanics in osmotic biofilm spreading”. *Soft Matter* 21 (2025): 2935–2945. <https://doi.org/10.1039/d4sm01463d>.
- Voss, Florian, and Uwe Thiele. “Chemo-mechanical motility modes of partially wetting liquid droplets” (2025). <https://doi.org/10.48550/ARXIV.2504.03297>.
- Zeugin, T., Keuchel, P., Morón, D., Coulter, F. B., Halic, M. M. N., Heil, M., Avila, M., & Holzner, M. (2025). Fluid structure interaction in pulsatile flow through an elastic pipe segment. *Physical Review Fluids*, 10(7), Article 073101. <https://doi.org/10.1103/ymqr-dbsw>
- Fontana, J. V., Cuttle, C., Pihler-Puzovic, D., Hazel, A. L. & Juel, A. (2024) Peeling fingers in an elastic Hele-Shaw channel. *Journal of Fluid Mechanics* **985** DOI: [10.1017/jfm.2024.210](https://doi.org/10.1017/jfm.2024.210)
- Lawless, J., Keeler, J., Hazel, A. L. & Juel, A. (2024) Stable bubble formations in a depth-perturbed Hele-Shaw channel *Physical Review Fluids* **9**, 093605. DOI: [10.1103/physrevfluids.9.093605](https://doi.org/10.1103/physrevfluids.9.093605)
- Miara, T., Vaquero-Stainer, C., Pihler-Puzovic, D., Heil, M., & Juel, A. (2024). Dynamics of inertialess sedimentation of a rigid U-shaped disk. *Communications physics*, 7(47). <https://doi.org/10.1038/s42005-024-01537-5>
- Vaquero-Stainer, C., Miara, T., Juel, A., Pihler-Puzovic, D., & Heil, M. (2024). U-shaped disks in Stokes flow: Chiral sedimentation of a non-chiral particle. *Journal of Fluid Mechanics*, 999. <https://doi.org/10.1017/jfm.2024.923>
- Diekmann, Jan, and Uwe Thiele. “Drops of volatile binary mixtures on brush-covered substrates”. *The European Physical Journal Special Topics* 233 (2024): 1615–1624. <https://doi.org/10.1140/epjs/s11734-024-01169-4>.
- Hartmann, Simon, et al. “Drops on Polymer Brushes: Advances in Thin-Film Modeling of Adaptive Substrates”. *Langmuir* 40 (2024): 4001–4021. <https://doi.org/10.1021/acs.langmuir.3c03313>.

- Voss, Florian, and Uwe Thiele. "Gradient dynamics approach to reactive thin-film hydrodynamics". *Journal of Engineering Mathematics* 149 (2024). <https://doi.org/10.1007/s10665-024-10402-x>.
 - Deblais, A., Xie, K., Lewin-Jones, P., Aarts, D., Herrada, M. A., Eggers, J., Sprittles, J. E., & Bonn, D. (2025). Early stages of drop coalescence. *Physical Review Fluids*, 10(4), L042001. <https://doi.org/10.1103/PhysRevFluids.10.L042001>
 - Lewin-Jones, P., Lockerby, D. A., & Sprittles, J. E. (2024). Collision of liquid drops: Bounce or merge? *Journal of Fluid Mechanics*, 995, A1. <https://doi.org/10.1017/jfm.2024.722>
 - Sprittles, J. E. (2024). Gas Microfilms in Droplet Dynamics: When Do Drops Bounce? *Annual Review of Fluid Mechanics*, 56(1), 91–118. <https://doi.org/10.1146/annurev-fluid-121021-021121>
 - Diddens, C. & Rocha, D. (2024). Bifurcation tracking on moving meshes and with consideration of azimuthal symmetry breaking instabilities. *Journal of Computational Physics* 518, 113306. <https://doi.org/10.1016/j.jcp.2024.113306>
- This paper provides a detailed description of `pyoomph`, "...an object-oriented multi-physics finite element framework for Python. It is mainly a custom high level frontend for the prime functionalities of the powerful C++ library oomph-lib..." (quote from their webpage). They maintain their own, impressively long [list of publications](#) (35 at the time of writing this (August 2025)) that involved the use of `pyoomph` or its predecessor codes.
- Maretvadakethope, S., Hazel, A. L., Vasiev, B. & Bearon, R. N. (2023) The interplay between bulk flow and boundary conditions on the distribution of micro-swimmers in channel flow. *Journal of Fluid Mechanics* 976, A13. DOI: [10.1017/jfm.2023.897](https://doi.org/10.1017/jfm.2023.897)
 - Smith, K., Retallick, A., Melendrez Armada, D., Vijayaraghavan, A., & Heil, M. (2023). Modelling graphene-polymer heterostructure MEMS membranes with the Föppl-von Kármán equations. *ACS Applied Materials and Interfaces*. <https://doi.org/10.1021/acsami.2c21096>
 - Li, H., Retallick, A., Juel, A., Heil, M., & Pihler-Puzovic, D. (2023). Swelling-induced Patterning in Soft Microchannels. *Soft Matter*. <https://doi.org/10.1039/D3SM01008B>
 - Cheng, H., Luding, S. & Weinhart, T. (2023), CG-enriched concurrent multi-scale modeling of dynamic surface interactions between discrete particles and solid continua. *Acta Mechanica Sinica*, 39(1). Article 722218. <https://doi.org/10.1007/s10409-022-22218-x>
 - Cheng, H., Thornton, A. R., Luding, S., Hazel, A. L. & Weinhart, T. (2023), Concurrent multi-scale modeling of granular materials: Role of coarse-graining in FEM-DEM coupling. *Computer methods in applied mechanics and engineering*, 403 (Part A). Article 115651. <https://doi.org/10.1016/j.cma.2022.115651>
 - Greve, Daniel, Simon Hartmann, and Uwe Thiele. "Stick-slip dynamics in the forced wetting of polymer brushes". *Soft Matter* 19 (2023): 4041–4061. <https://doi.org/10.1039/d3sm00104k>.
 - Hartmann, Simon, et al. "Sessile drop evaporation in a gap – crossover between diffusion-limited and phase transition-limited regime". *Journal of Fluid Mechanics* 960 (2023). <https://doi.org/10.1017/jfm.2023.176>.
 - Kap, Özlem, et al. "Nonequilibrium configurations of swelling polymer brush layers induced by spreading drops of weakly volatile oil". *The Journal of Chemical Physics* 158 (2023). <https://doi.org/10.1063/5.0146779>.
 - Kasischke, Maren, et al. "Pattern formation in slot-die coating". *Physics of Fluids* 35 (2023). <https://doi.org/10.1063/5.0150340>.
 - Keeler, J. S., Gaillard, A., Lawless, J., Thompson, A., Juel, A. & Hazel, A. (2022) The interaction of multiple bubbles in a Hele-Shaw channel *Journal of Fluid Mechanics* 946 A40 DOI: [10.1017/jfm.2022.618](https://doi.org/10.1017/jfm.2022.618)
 - Lawless, J., Keeler, J., Gaillard, A., Hazel, A. & Juel, A. (2022) The Unpredictable Nature of Bubble Evolution. *Scientific Reports*, 12. DOI: [10.1038/s41598-022-23231-8](https://doi.org/10.1038/s41598-022-23231-8)
 - Henkel, C., et al. "Soft wetting with (a)symmetric Shuttleworth effect". *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences* 478 (2022). <https://doi.org/10.1098/rspa.2022.0132>.

- Stegemerten, Fenna, Karin John, and Uwe Thiele. "Symmetry-breaking, motion and bistability of active drops through polarization-surface coupling". *Soft Matter* 18 (2022): 5823–5832. <https://doi.org/10.1039/d2sm00648k>.
- Matharu, P., Hazel, A., & Heil, M. (2021). Spatio-temporal symmetry breaking in the flow past an oscillating cylinder. *Journal of Fluid Mechanics*, **918**, A42. doi:10.1017/jfm.2021.358.

See also the accompanying "Focus on Fluids" article: Hourigan, K. (2021). Exotic wakes of an oscillating circular cylinder: How singles pair up. *Journal of Fluid Mechanics*, **922**, F1. doi:10.1017/jfm.2021.492

- Nogueira Fontana, J.V., Juel, A., Bergemann, N., Heil, M. & Hazel, A. (2021) Modelling finger propagation in elasto-rigid channels. *Journal of Fluid Mechanics* **916** A27. doi:10.1017/jfm.2021.219
- Henkel, Christopher, Jacco H. Snoeijer, and Uwe Thiele. "Gradient-dynamics model for liquid drops on elastic substrates". *Soft Matter* 17 (2021): 10359–10375. <https://doi.org/10.1039/dlsm01032h>.
- Mitas, Kevin David Joachim, Ofer Manor, and Uwe Thiele. "Bifurcation study for a surface-acoustic-wave-driven meniscus". *Physical Review Fluids* 6 (2021): 094002. <https://doi.org/10.1103/physrevfluids.6.094002>.
- Keeler, J., Thompson, A., Lemoult, G., Juel, A. & Hazel, A. (2020) The influence of invariant solutions on the transient behaviour of an air bubble in a Hele-Shaw channel. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Science*, **475**, p. 1-21 21 p., 20190434. DOI: 10.1098/rspa.2019.0434
- Xu, D., Heil,M., Seeboeck, T. & Avila, M. (2020)
Resonances in Pulsatile Channel Flow with an Elastic Wall *Phys. Rev. Lett.* **125**, 254501. DOI: 10.1103/PhysRevLett.125.254501
- Thiele, Uwe, and Simon Hartmann. "Gradient dynamics model for drops spreading on polymer brushes". *The European Physical Journal Special Topics* 229 (2020): 1819–1832. <https://doi.org/10.1140/epjst/e2020-900231-2>.
- Trinschek, Sarah, et al. "Thin-film modeling of resting and moving active droplets". *Physical Review E* 101 (2020): 062802. <https://doi.org/10.1103/physreve.101.062802>.
- Saxby, B. & Hazel, A. (2019) Improving the Modified XFEM for Optimal High-Order Approximation. *International Journal for Numerical Methods in Engineering*. 10.1002/nme.6214
- Kant, P., Hazel, A., Dowling, M., Thompson, A. & Juel, A. (2019) POLED displays: Robust printing of pixels. *Applied Physics Letters*. DOI: 10.1063/1.5115410
- Vaquero-Stainer, C., Heil, M., Juel, A. & Pihler-Puzovic, D. (2019) Self-similar and disordered front propagation in a radial Hele-Shaw channel with time-varying cell depth. *Physical Review Fluids* **4**, 064002. DOI: 10.1103/PhysRevFluids.4.064002.
- Shepherd, D., Miles, J., Heil, M. & Mihajlovic, M. (2019) An adaptive step implicit midpoint rule for the time integration of Newton's linearisations of non-linear problems with applications in micromagnetics. *Journal of Scientific Computing* **80**, 1058-1082. DOI: 10.1007/s10915-019-00965-8
- Nielsen, A.R., Heil, M., Andersen, M. & Brons, M. (2019) Bifurcation theory for vortices with application to boundary layer eruption. *Journal of Fluid Mechanics* **865**, 831-849. DOI: <https://doi.org/10.1017/jfm.2019.97>
- Franco Gomez, A., Thompson, A., Hazel, A. & Juel, A. (2018) Bubble propagation in Hele-Shaw channels with centred constrictions *Fluid Dynamics Research*. DOI: 10.1088/1873-7005/aaa5cf
- Banks, M., Hazel, A. & Riley, G. (2018) Quantitative Validation of Physically Based Deformable Models in Computer Graphics. DOI: 10.2312/vriphys.20181062
- Kant, P., Hazel, A., Dowling, M., Thompson, A. B. & Juel, A. (2018) Sequential deposition of microdroplets on patterned surfaces *Soft Matter*, **14**, 43, p. 8709-8716. DOI: 10.1039/C8SM01373J

- Pihler-Puzovic, D., Peng, G., Lister, J. R., Heil, M. & Juel, A. (2018) Viscous fingering in a radial elastic-walled Hele-Shaw cell. *Journal of Fluid Mechanics* **849**, 163-191. DOI: <https://doi.org/10.1017/jfm.2018.404>
- Bergemann, N., Juel, A. & Heil, M. (2018) Viscous drop spreading on a layer of the same fluid: from sinking, wedging and spreading to their long-time evolution. *Journal of Fluid Mechanics* **843**, 1-28. DOI: <https://doi.org/10.1017/jfm.2018.127>.
- Kant, P., Hazel, A., Dowling, M., Thompson, A. & Juel, A. (2017) Controlling droplet spreading with topography. *Physical Review Fluids*, **2**, 094002. DOI: <10.1103/PhysRevFluids.2.094002>
- Johnson, C., Jain, U., Hazel, A., Pihler-Puzovic, D. & Mullin, T. (2017) On the Buckling of an Elastic Holey Column. *Royal Society of London. Proceedings A. Mathematical, Physical and Engineering Sciences*. DOI: <10.1098/rspa.2017.0477>
- Hazel, A. & Mullin, T. (2017) On the Buckling of Elastic Rings by External Confinement. *Royal Society of London. Proceedings A. Mathematical, Physical and Engineering Sciences*, **375**, 2093, 20160227. DOI: <10.1098/rsta.2016.0227>
- Walters, M.C., Heil, M., Whittaker, R.J. (2017) The Effect of Wall Inertia on High-Frequency Instabilities of Flow Through an Elastic-Walled Tube *The Quarterly Journal of Mechanics and Applied Mathematics*, hbx024. Direct electronic access to article. DOI: <https://doi.org/10.1093/qjmam/hbx024>
- Radtke, P. K., Hazel, A., Straube, A. V. & Schimansky-Geier, L. (2017) Stochastic Dynamics of Resistive Switching: Fluctuations Lead to Optimal Particle Number. *New Journal of Physics*. DOI: <10.1088/1367-2630/aa818b>
- Cisonni, J., Lucey, A.D., Elliott, S.J & Heil, M. (2017) The stability of a flexible cantilever in viscous channel flow *Journal of Sound and Vibration* **369** 186-202. DOI: <10.1016/j.jsv.2017.02.045>
- Lopes, André v. B., Uwe Thiele, and Andrew L. Hazel. "On the multiple solutions of coating and rimming flows on rotating cylinders". *Journal of Fluid Mechanics* 835 (2017): 540–574. <https://doi.org/10.1017/jfm.2017.756>.
- Heil, M., Rosso, J., Hazel, A.L., Brons, M. (2017). Topological fluid mechanics of the formation of the Karman-vortex street. *Journal of Fluid Mechanics* **812** 199-221. DOI: <https://doi.org/10.1017/jfm.2016.792> (Open Access).
- Bertram, C. & Heil, M. (2017). A Poroelastic Fluid/Structure-Interaction Model of Cerebrospinal Fluid Dynamics in the Cord with Syringomyelia and Adjacent Subarachnoid-Space Stenosis. *Journal of Biomechanical Engineering*, **139**(1), 1-10. DOI: <10.1115/1.4034657>
- Pihler-Puzovic, D., Hazel, A. & Mullin, T. (2016) Buckling of a Holey Column. *Soft Matter*, **12**, p. 7112-7118. DOI: <10.1039/C6SM00948D>
- Franco Gomez, A., Thompson, A., Hazel, A. & Juel, A. (2016) Sensitivity of Saffman-Taylor fingers to channel-depth perturbations. *Journal of Fluid Mechanics*, **794**, p. 343-368. DOI: <10.1017/jfm.2016.131>
- Heil, M. & Bertram, C. (2016). A poroelastic fluid-structure interaction model of syringomyelia. *Journal of Fluid Mechanics*, **809**, 360-389. DOI: <https://doi.org/10.1017/jfm.2016.669>
- Pestana, J., Muddle, R., Heil, M., Tisseur, F. & Mihajlovic M. (2016) Efficient block preconditioning for a C1 finite element discretisation of the Dirichlet biharmonic problem. *SIAM Journal on Scientific Computing* **38**(1), A325-A345. DOI: <10.1137/15M1014887> . (pdf)
- Bearon, R. N. & Hazel, A. L. (2015) The trapping in high-shear regions of slender bacteria undergoing chemotaxis in a channel. *Journal of Fluid Mechanics*, **771**, p. R3-1-R3-13. DOI: <10.1017/jfm.2015.198>
- Heil, M. & Hazel, A.L. (2015) Flow in flexible/collapsible tubes. In: *Fluid-Structure Interactions in Low-Reynolds-Number Flows*. Eds: Duprat, C. & Stone, H.A. Royal Society of Chemistry, RSC Publishing.

- Pihler-Puzovic, D., Juel, A., Peng, G., Lister, J. & Heil, M. (2015) Displacement flows under elastic membranes. Part 1: Experiments and direct numerical simulations. *Journal of Fluid Mechanics* **784** 487- 511. DOI: [doi:10.1017/jfm.2015.590](https://doi.org/10.1017/jfm.2015.590) . (pdf)
- Peng, G., Pihler-Puzovic, D., Juel, A., Heil, M. & Lister, J. (2015) Displacement flows under elastic membranes. Part 2: Analysis of interfacial effects. *Journal of Fluid Mechanics* **784** 512- 547. DOI: [doi:10.1017/jfm.2015.589](https://doi.org/10.1017/jfm.2015.589) . (pdf)
- Cimpeanu, R., Martinsson, A. & Heil, M. (2015) A parameter-free perfectly matched layer formulation for the finite-element-based solution of the Helmholtz equation. *Journal of Computational Physics* **296** 329–347. DOI: [doi:10.1016/j.jcp.2015.05.006](https://doi.org/10.1016/j.jcp.2015.05.006).
- Dijkstra, H. A., Wubs, F. W., Cliffe, A. K., Doedel, E., Dragomirescu, I. F., Eckhardt, B., Gelfgat, A. Y., Hazel, A. L., Lucarini, V., Salinger, A. G., Phipps, E. T., Juan, S. U., Schuttelaars, H., Tuckerman, L. S. & Thiele, U. (2014) Numerical bifurcation methods and their application to fluid dynamics: Analysis beyond simulation *Communications in Computational Physics*, **15**, 1, p. 1-45. DOI: [10.4208/cicp.240912.180613a](https://doi.org/10.4208/cicp.240912.180613a)
- Pihler-Puzovic, D., Perillat, R., Russell, M., Juel, A. & Heil, M. (2013) Modelling the suppression of viscous fingering in elastic-walled Hele-Shaw cells. *Journal of Fluid Mechanics* **731**, 162-183 DOI: [10.1017/jfm.2013.375](https://doi.org/10.1017/jfm.2013.375)
- Pihler-Puzovic, D., Juel, A. & Heil, M. (2014) The interaction between viscous fingering and wrinkling in elastic-walled Hele-Shaw cells. *Physics of Fluids* **26**, 022102. DOI: [doi:10.1063/1.4864188](https://doi.org/10.1063/1.4864188).
- Shepherd, D., Miles, J., Heil, M., Mihajlovic, M. (2014) Discretisation induced stiffness in micromagnetic simulations. *IEEE Trans. Magn.*, **50**(11) 7201304. DOI: [10.1109/TMAG.2014.2325494](https://doi.org/10.1109/TMAG.2014.2325494)
- Thompson, A., Juel, A. & Hazel, A. L. (2014) Multiple finger propagation modes in Hele-Shaw channels of variable depth. *Journal of Fluid Mechanics*, **746**, p. 123-164 DOI: [10.1017/jfm.2014.100](https://doi.org/10.1017/jfm.2014.100)
- Thompson, A., Tipton, C., Juel, A., Hazel, A. & Dowling, M. (2014) Sequential deposition of overlapping droplets to form a liquid line. *Journal of Fluid Mechanics*, **761**, p. 261-281 DOI: [10.1017/jfm.2014.621](https://doi.org/10.1017/jfm.2014.621)
- Muddle, R.L., Mihajlovic, M. & Heil, M. (2012) An efficient preconditioner for monolithically-coupled large-displacement fluid-structure interaction problems with pseudo-solid mesh updates. *Journal of Computational Physics* **231**, 7315-7334. DOI: [10.1016/j.jcp.2012.07.001](https://doi.org/10.1016/j.jcp.2012.07.001)
- Heil, M., Kharrat, T., Cotterill, P.A. & Abrahams, I.D. (2012) Quasi-resonances in sound-insulating coatings. *Journal of Sound and Vibration* **331** 4774-4784. DOI: [10.1016/j.jsv.2012.05.029](https://doi.org/10.1016/j.jsv.2012.05.029)
- Hazel, A. L., Heil, M., Waters, S.L. & Oliver, J.M. (2012) On the liquid lining in fluid-conveying curved tubes. *Journal of Fluid Mechanics* **705**, 213-233. DOI: [10.1017/jfm.2011.346](https://doi.org/10.1017/jfm.2011.346)
- Willoughby, N., Parnell, W. J., Hazel, A. L. & Abrahams, I. D.(2012) Homogenization methods to approximate the effective response of random fibre-reinforced composites *International Journal of Solids and Structures* **49**, 1421–1433. DOI: [10.1016/j.ijsolstr.2012.02.010](https://doi.org/10.1016/j.ijsolstr.2012.02.010)
- Hewitt, R. E., Hazel, A. L., Clarke, R. J. & Denier, J. P. (2011) Unsteady flow in a torus after a sudden change in rotation rate *Journal of Fluid Mechanics* , **68**, 88–119. DOI: [10.1017/jfm.2011.36](https://doi.org/10.1017/jfm.2011.36)
- Haines, P.E. Hewitt, R. E. & Hazel, A. L. (2011) The Jeffery–Hamel similarity solution and its relation to flow in a diverging channel *Journal of Fluid Mechanics* , **687**, 404–430. DOI: [10.1017/jfm.2011.362](https://doi.org/10.1017/jfm.2011.362)
- Bearon, R. N., Hazel, A. L. & Thorn, G. J. (2011) The spatial distribution of gyrotactic swimming micro-organisms in laminar flow fields. *Journal of Fluid Mechanics* , **680**, 602–635. DOI: [10.1017/jfm.2011.198](https://doi.org/10.1017/jfm.2011.198)
- Stewart, P.S., Heil, M., Waters, S.L. & Jensen, O.E. (2010) Sloshing and slamming oscillations in collapsible channel flow. *Journal of Fluid Mechanics* **662**, 288-319. (abstract) (pdf) (Supplementary material (movie))
- Whittaker, R.J., Heil, M., Jensen, O.E., & Waters, S.L. (2010) The onset of high-frequency self-excited oscillations in elastic-walled tubes. *Proceedings of the Royal Society A* **466**, 3635-3657. (abstract) (pdf)

- Whittaker, R.J., Heil, M., Jensen, O.E., & Waters, S.L. (2010) A rational derivation of a tube law from shell theory. *Quarterly Journal of Mechanics and Applied Mathematics* ([pdf](#)) ([abstract](#))
- Heil, M., Boyle, J. (2010) Self-excited oscillations in three-dimensional collapsible tubes: Simulating their onset and large-amplitude oscillations. *Journal of Fluid Mechanics* **652**, 405-426 ([abstract](#)) ([pdf](#))
- Whittaker, R.J., Waters, S.L., Jensen, O.E., Boyle, J. & Heil, M. (2010) The energetics of flow through a rapidly oscillating tube. Part I: General theory. *Journal of Fluid Mechanics* **648**, 83-121 ([abstract](#)) ([pdf](#))
- Whittaker, R.J., Heil, M., Boyle, J., Jensen, O.E., & Waters, S.L. (2010) The energetics of flow through a rapidly oscillating tube. Part II: Application to an elliptical tube. *Journal of Fluid Mechanics* **648**, 123-153 ([abstract](#)) ([pdf](#))
- de Lózar, A., Juel, A. & Hazel, A. L. (2008) The steady propagation of an air finger into a rectangular tube. *Journal of Fluid Mechanics* **614**, pp 173–195. [Link to electronic journal](#)
- Hazel, A.L. & Heil, M. (2008) The influence of gravity on the steady propagation of a semi-infinite bubble into a flexible channel. *Physics of Fluids* **20**, 092109. ([abstract](#)) ([pdf preprint](#))
- Heil, M., Hazel, A.L. & Boyle, J. (2008): Solvers for large-displacement fluid-structure interaction problems: Segregated vs. monolithic approaches. *Computational Mechanics*. ([journal link](#))
- Heil, M. & Waters, S.L. (2008) How rapidly oscillating collapsible tubes extract energy from a mean flow. *Journal of Fluid Mechanics* **601**, 199-227. ([journal link](#)).
- Hewitt, R. E. & Hazel, A. L. (2006) Midplane-symmetry breaking in the flow between two counter-rotating disks. *Journal of Engineering Mathematics*
DOI: 10.1007/s10665-006-9098-2. ([journal link](#))
- Heil, M. & Hazel, A. L. (2006) oomph-lib – An Object-Oriented Multi-Physics Finite-Element Library. In: *Fluid-Structure Interaction*, Editors: M. Schafer und H.-J. Bungartz. Springer (Lecture Notes on Computational Science and Engineering), pp 19–49. ([abstract](#)) ([pdf preprint](#))
- Heil, M. & Waters, S.L. (2006) Transverse flows in rapidly oscillating, elastic cylindrical shells. *Journal of Fluid Mechanics* **547**, 185-214. ([abstract](#)) ([pdf preprint](#))
- Jensen, O.E. & Heil, M. (2003) High-frequency self-excited oscillations in a collapsible-channel flow. *Journal of Fluid Mechanics* **481** 235-268. ([pdf preprint](#)) ([abstract](#))

The computations shown in this paper were performed in the days before oomph-lib, but the problem considered in this study now features in oomph-lib demo problems:

- Flow in a 2D channel with an oscillating wall.
- Flow in a 2D collapsible channel.

1.1 PDF file

A [pdf version](#) of this document is available. \