







CURRICULUM VITÆ OF IVAN C. CHRISTOV





 Assistant Professor
 School of Mechanical Engineering, Purdue University
 585 Purdue Mall, West Lafayette, IN 47907-2088

 christov@purdue.edu
 christov.tmnt-lab.org
 +1-765-496-3733

Research Interests:

- **Complex and Nonlinear Systems:** the study of the mechanics of natural phenomena using advanced mathematical techniques and state-of-the-art computational simulations; in particular: soft hydraulics and microscale fluid–structure interactions, flows in heterogeneous porous media, multiphase interfacial instabilities, diffusion, mixing and self-organization of granular matter, viscoelasticity and non-Newtonian fluid mechanics, shock formation and compressible flows, wave propagation and metamaterials, nonlinear field theories and coherent structures.
- **Numerical Methods/Analysis:** the development of high-performance simulation techniques for real-world applications; in particular: finite-volume methods for multiphase flows and reservoir simulation, implicit conservative finite-difference and finite element methods for nonlinear diffusion and nonlinear wave equations, two-way-coupled approaches for viscous fluid–structure interactions, and Godunov-type schemes for conservation laws.

Education:

-  **PhD** in Applied Mathematics — **Northwestern University**, Evanston, IL. (Sept. 2007–June 2011)
 - ▷ Dissertation: “From Streamline Jumping to Strange Eigenmodes and Three-Dimensional Chaos: A Tour of the Mathematical Aspects of Granular Mixing in Rotating Tumblers.”
 - ▷ Advisors: Julio M. Ottino and Richard M. Lueptow.
-  **MS** in Applied Mathematics — **Northwestern University**, Evanston, IL. (Sept. 2007–June 2008)
-  **MS** in Mathematics — **Texas A&M University**, College Station, TX. (Aug. 2005–May 2007)
-  **SB** in Mathematics — **Massachusetts Institute of Technology**, Cambridge, MA. (Sept. 2002–June 2005)

Professional Appointments:

- **Purdue University**, West Lafayette, IN.
 - ▷ Assistant Professor, School of Mechanical Engineering (Jan. 2016–present)
 - ▷ Affiliate, Center for Particulate Processes and Products (CP³) (Jan. 2016–present)
 - ▷ Affiliate, Center for the Environment (C4E) (Sept. 2019–present).
 - ▷ Affiliate, Computational Interdisciplinary Graduate Program (CIGP) (Aug. 2016–present)
 - ▷ Affiliate, Integrative Data Science Initiative (IDSI) (May. 2020–present)
- Theoretical Division and Center for Nonlinear Studies, **Los Alamos National Laboratory**, Los Alamos, NM.
 - ▷ Richard P. Feynman Distinguished Postdoctoral Fellow in Theory and Computing (July 2013–Dec. 2015)
 - ▷ Mentors: Eli Ben-Naim and R. E. Ecke.
- Department of Mechanical and Aerospace Engineering, **Princeton University**, Princeton, NJ.
 - ▷ NSF Mathematical Sciences Postdoctoral Research Fellow (Sept. 2011–June 2013)
 - ▷ Mentor: Howard A. Stone.
- Reservoir Simulation Development, **ExxonMobil Upstream Research Company**, Houston, TX.
 - ▷ Intern/Co-op (June 2008–Sept. 2008)
 - ▷ Mentor: Ilya D. Mishev.
- Acoustics Division, **U.S. Naval Research Laboratory**, Stennis Space Center, MS.
 - ▷ Naval Research Enterprise Intern (June 2007–Aug. 2007); Engineering Tech Level I (June 2005–Aug. 2005)
 - ▷ Mentors: Pedro M. Jordan and Stanley A. Chin-Bing.

Publications:¹

(* indicates corresponding author(s), if applicable; ► denotes a key publication.

†/‡ denotes undergraduate/graduate researchers advised at the time.)

 0000-0001-8531-0531

 B-9418-2008  P 559425

 Google Scholar

Forthcoming:

(Preprints available on  [arXiv.org](https://arxiv.org) or upon request by  email.)

7. Ruihuan Cai,[‡] Hongyi Xiao, Ivan C. Christov,^{*} Yongzhi Zhao,^{*} “Diffusion of ellipsoidal granular particles in shear flow,” accepted for publication in *AIChE Journal* (2020); doi:10.1002/aic.17109.
6. Zongxin Yu,[‡] Ivan C. Christov,^{*} “Tuning a Magnetic Field to Generate Spinning Ferrofluid Droplets with Controllable Speed via Nonlinear Periodic Interfacial Waves,” submitted; arXiv:2009.04644.
5. Xiaojia Wang,[‡] Ivan C. Christov,^{*} “Soft Hydraulics in Channels with Thick Walls: The Finite-Reynolds-Number Base State and Its Stability,” submitted to the proceedings of AMiTANS’20; arXiv:2007.11733.
4. Daihui Lu,[‡] Federico Municchi, Ivan C. Christov,^{*} “The Hydraulic Conductivity of a Shaped Fracture With Permeable Walls,” submitted; ESSOAr.10503684.1.
3. Vishal Anand,^{‡,*} Ivan C. Christov,^{*} “Transient compressible flow in a compliant viscoelastic tube,” accepted for publication in *Physics of Fluids*, doi:10.1063/5.0022406; arXiv:2007.03077. * Invited paper.
2. Ivan C. Christov, Robert J. Decker, A. Demirkaya, Vakhid A. Gani, P. G. Kevrekidis, Avadh Saxena, “Kink-Antikink Collisions and Multi-Bounce Resonance Windows in Higher-Order Field Theories,” submitted; arXiv:2005.00154.
1. Vishal Anand,[‡] Ivan C. Christov,^{*} “Revisiting steady viscous flow of a generalized Newtonian fluid through a slender elastic tube using shell theory,” *Zeitschrift für Angewandte Mathematik und Mechanik (ZAMM)* ?? (2020) e201900309, doi:10.1002/zamm.201900309; arXiv:1810.05155.

In Refereed Journals:

61. Rui Yang, Ivan C. Christov, Ian M. Griffiths, Guy Z. Ramon,^{*} “Time-averaged transport in oscillatory squeeze flow of a viscoelastic fluid,” *Physical Review Fluids* **5** (2020) 094501, doi:10.1103/PhysRevFluids.5.094501; arXiv:2006.01252.
60. Ivan C. Christov,^{*} Akif Ibragimov, Rahnuma Islam, “Long-time asymptotics of non-degenerate non-linear diffusion equations,” *Journal of Mathematical Physics* **61** (2020) 081505, doi:10.1063/5.0005339; arXiv:2002.07937.
59. Tanmay C. Inamdar,[‡] Xiaojia Wang,[‡] Ivan C. Christov,^{*} “Unsteady fluid-structure interactions in a soft-walled microchannel: A one-dimensional lubrication model for finite Reynolds number,” *Physical Review Fluids* **5** (2020) 064101, doi:10.1103/PhysRevFluids.5.064101; arXiv:1808.03954.
58. Vishal Anand,[‡] Sanjan C. Muchandimath,[†] Ivan C. Christov,^{*} “Hydrodynamic Bulge Testing: Materials Characterization without Measuring Deformation,” *ASME Journal of Applied Mechanics* **87** (2020) 051012, doi:10.1115/1.4046297; arXiv:1910.03513.
57. Daihui Lu,[‡] Federico Municchi, Ivan C. Christov,^{*} “Computational Analysis of Interfacial Dynamics in Angled Hele-Shaw Cells: Instability Regimes,” *Transport in Porous Media* **131** (2020) 907–934, doi:10.1007/s11242-019-01371-2; arXiv:1811.06960.
- 56. Xiaojia Wang,[‡] Ivan C. Christov,^{*} “Theory of the flow-induced deformation of shallow compliant microchannels with thick walls,” *Proceedings of the Royal Society A* **475** (2019) 20190513, doi:10.1098/rspa.2019.0513; arXiv:1908.03556.
55. Federico Municchi, Pranay P. Nagrani,[†] Ivan C. Christov,^{*} “A two-fluid model for numerical simulation of shear-dominated suspension flows,” *International Journal of Multiphase Flow* **120** (2019) 103079, doi:10.1016/j.ijmultiphaseflow.2019.07.015; arXiv:1811.06972.

¹N.B. Due to the interdisciplinary nature of my research, authorship conventions differ across my publications. Many publications are in the traditional “first author”–“last (corresponding) author” format. However, several publications also list the authors alphabetically, see the discussion at <https://www.ams.org/profession/leaders/culture/JointResearchandItsPublicationfinal.pdf>

- 54. [Ivan C. Christov](#), Robert J. Decker, A. Demirkaya, Vakhid A. Gani, P. G. Kevrekidis, Avinash Khare, Avadh Saxena, “Kink-Kink and Kink-Antikink Interactions with Long-Range Tails,” *Physical Review Letters* **122** (2019) 171601, doi:10.1103/PhysRevLett.122.171601; arXiv:1811.07872.
53. [Ivan C. Christov](#), Robert J. Decker, A. Demirkaya, Vakhid A. Gani, P. G. Kevrekidis, R. V. Radomskiy, “Long-range interactions of kinks,” *Physical Review D* **99** (2019) 016010, doi:10.1103/PhysRevD.99.016010; arXiv:1810.03590.
52. Vishal Anand,[‡] Joshua David John Rathinaraj,[†] [Ivan C. Christov](#),* “Non-Newtonian fluid–structure interactions: Static response of a microchannel due to internal flow of a power-law fluid,” *Journal of Non-Newtonian Fluid Mechanics* **264** (2019) 62–72, doi:10.1016/j.jnnfm.2018.12.008; arXiv:1809.09065.
- ▷ See also: Corrigendum of a typesetting issue regarding the second author’s name, *ibid.* **285** (2020) 104384, doi:10.1016/j.jnnfm.2020.104384.
51. [Ivan C. Christov](#), “On a C -integrable equation for second sound propagation in heated dielectrics,” *Evolution Equations and Control Theory* **8** (2019) 57–72, doi:10.3934/eect.2019004; arXiv:1801.09857.
50. Vishal Anand,[‡] [Ivan C. Christov](#),* “On the Enhancement of Heat Transfer and Reduction of Entropy Generation by Asymmetric Slip in Pressure-Driven Non-Newtonian Microflows,” *ASME Journal of Heat Transfer* **141** (2019) 022403, doi:10.1115/1.4042157; arXiv:1803.09178.
49. R.S. Keiffer, P.M. Jordan,* [I.C. Christov](#), “Acoustic shock and acceleration waves in selected inhomogeneous fluids,” *Mechanics Research Communications* **93** (2018) 80–88, doi:10.1016/j.mechrescom.2017.11.003; arXiv:1711.09451.
48. Mengying Wang,[‡] [Ivan C. Christov](#),* “Cutting and shuffling with diffusion: Evidence for cut-offs in interval exchange maps,” *Physical Review E* **98** (2018) 022221, doi:10.1103/PhysRevE.98.022221; arXiv:1804.01448.
47. [Ivan C. Christov](#), “On the numerical solution of a variable-coefficient Burgers equation arising in granular segregation,” *Materials Physics and Mechanics* **35** (2018) 21–27, doi:10.18720/MPM.3512018_4; arXiv:1707.00034.
- 46. [Ivan C. Christov](#),* Vincent Cognet,[†] Tanmay C. Shidhore,[‡] Howard A. Stone,* “Flow rate–pressure drop relation for deformable shallow microfluidic channels,” *Journal of Fluid Mechanics* **841** (2018) 267–286, doi:10.1017/jfm.2018.30; arXiv:1712.02687.
45. Tanmay C. Shidhore,[‡] [Ivan C. Christov](#),* “Static response of deformable microchannels: a comparative modelling study,” *Journal of Physics: Condensed Matter* **30** (2018) 054002, doi:10.1088/1361-648X/aaa226; arXiv:1709.03002.
- ▷ See also: Corrigendum, *ibid.* **32** (2020) 439501, doi:10.1088/1361-648X/aba71f.
44. A. Demirkaya,* R. Decker, P. G. Kevrekidis, [I. C. Christov](#), A. Saxena, “Kink dynamics in a parametric ϕ^6 system: a model with controllably many internal modes,” *Journal of High Energy Physics (JHEP)* **2017**(12) (2017) 71, doi:10.1007/JHEP12(2017)071; arXiv:1706.01193.
- 43. [Ivan C. Christov](#),* C.I. Christov, “On mechanical waves and Doppler shifts from moving boundaries,” *Mathematical Methods in the Applied Sciences* **40** (2017) 4481–4492, doi:10.1002/mma.4318; arXiv:1612.09269.
42. [Ivan C. Christov](#), “Nonlinear waves in electromigration dispersion in a capillary,” *Wave Motion* **71** (2017) 42–52, doi:10.1016/j.wavemoti.2016.06.011; arXiv:1603.08277.
41. [Ivan C. Christov](#),* Tyler Kress,[†] Avadh Saxena, “Peakcompactons: Peaked compact nonlinear waves,” *International Journal of Modern Physics B* **31** (2017) 1742008, doi:10.1142/S0217979217420085; arXiv:1609.09542.
40. [Ivan C. Christov](#),* P.M. Jordan, “Comment on “Locomotion of a microorganism in weakly viscoelastic liquids,”” *Physical Review E* **94** (2016) 057101, doi:10.1103/PhysRevE.94.057101.
39. [Ivan C. Christov](#), “Nonlinear acoustics and shock formation in lossless barotropic Green–Naghdi fluids,” *Evolution Equations and Control Theory* **5** (2016) 349–365, doi:10.3934/eect.2016008; arXiv:1601.06430.
38. [Ivan C. Christov](#), P.M. Jordan,* S.A. Chin-Bing, A. Warn-Varnas, “Acoustic traveling waves in thermoviscous perfect gases: Kinks, acceleration waves, and shocks under the Taylor–Lighthill balance,” *Mathematics and Computers in Simulation* **127** (2016) 2–18, doi:10.1016/j.matcom.2013.03.011.

37. [Ivan C. Christov](#),* C.I. Christov, “Stress retardation versus stress relaxation in linear viscoelasticity,” *Mechanics Research Communications* **72** (2016) 59–63, doi:[10.1016/j.mechrescom.2016.01.005](https://doi.org/10.1016/j.mechrescom.2016.01.005); arXiv:[1512.09360](https://arxiv.org/abs/1512.09360).
36. Ivan C. Christov, “Comment on “The velocity field due to an oscillating plate in an Oldroyd-B fluid” by C.C. Hopkins and J.R. de Bruyn [Can. J. Phys. **92**, 533 (2014)],” *Canadian Journal of Physics* **93** (2015) 1651–1652, doi:[10.1139/cjp-2015-0374](https://doi.org/10.1139/cjp-2015-0374); arXiv:[1506.01470](https://arxiv.org/abs/1506.01470).
35. Ivan C. Christov, “On a hierarchy of nonlinearly dispersive generalized KdV equations,” *Proceedings of the Estonian Academy of Sciences* **64** (2015) 212–218, doi:[10.3176/proc.2015.3.02](https://doi.org/10.3176/proc.2015.3.02); arXiv:[1501.01044](https://arxiv.org/abs/1501.01044).
34. [Ivan C. Christov](#), P.M. Jordan,* “Corrections to Morse and Ingard’s variational-based treatment of weakly-non-linear acoustics in lossless gases,” *Journal of the Acoustical Society of America* **138** (2015) 361–362, doi:[10.1121/1.4922951](https://doi.org/10.1121/1.4922951).
33. Zhong Zheng,[‡] Bo Guo, [Ivan C. Christov](#), Michael A. Celia, Howard A. Stone,* “Flow regimes for fluid injection into a confined porous medium,” *Journal of Fluid Mechanics* **767** (2015) 881–909, doi:[10.1017/jfm.2015.68](https://doi.org/10.1017/jfm.2015.68).
- 32. Avinash Khare, [Ivan C. Christov](#), Avadh Saxena, “Successive phase transitions and kink solutions in ϕ^8 , ϕ^{10} , and ϕ^{12} field theories,” *Physical Review E* **90** (2014) 023208, doi:[10.1103/PhysRevE.90.023208](https://doi.org/10.1103/PhysRevE.90.023208); arXiv:[1402.6766](https://arxiv.org/abs/1402.6766).
31. [Ivan C. Christov](#),* Howard A. Stone, “Shear dispersion in dense granular flows,” *Granular Matter* **16** (2014) 509–515, doi:[10.1007/s10035-014-0498-0](https://doi.org/10.1007/s10035-014-0498-0); arXiv:[1402.6765](https://arxiv.org/abs/1402.6765).
30. [Ivan C. Christov](#), Richard M. Lueptow, Julio M. Ottino, Rob Sturman, “A Study in Three-Dimensional Chaotic Dynamics: Granular Flow and Transport in a Bi-Axial Spherical Tumbler,” *SIAM Journal on Applied Dynamical Systems* **13** (2014) 901–943, doi:[10.1137/130934076](https://doi.org/10.1137/130934076); arXiv:[1404.4660](https://arxiv.org/abs/1404.4660).
- 29. Zhong Zheng,[‡] [Ivan C. Christov](#), Howard A. Stone,* “Influence of heterogeneity on second-kind self-similar solutions for viscous gravity currents,” *Journal of Fluid Mechanics* **747** (2014) 218–246, doi:[10.1017/jfm.2014.148](https://doi.org/10.1017/jfm.2014.148).
28. [Ivan C. Christov](#), P.M. Jordan,* “On an instability exhibited by the ballistic-diffusive heat conduction model of Xu and Hu,” *Proceedings of the Royal Society A* **470** (2014) 20130557, doi:[10.1098/rspa.2013.0557](https://doi.org/10.1098/rspa.2013.0557).
- 27. Talal T. Al-Housseiny,^{*,‡} [Ivan C. Christov](#), Howard A. Stone, “Two-Phase Fluid Displacement and Interfacial Instabilities Under Elastic Membranes,” *Physical Review Letters* **111** (2013) 034502, doi:[10.1103/PhysRevLett.111.034502](https://doi.org/10.1103/PhysRevLett.111.034502).
26. Ivan C. Christov, “On a difficulty in the formulation of initial and boundary conditions for eigenfunction expansion solutions for the start-up of fluid flow,” *Mechanics Research Communications* **51** (2013) 86–92, doi:[10.1016/j.mechrescom.2013.05.005](https://doi.org/10.1016/j.mechrescom.2013.05.005); arXiv:[1305.5999](https://arxiv.org/abs/1305.5999).
25. Conor P. Schlick, [Ivan C. Christov](#), Paul B. Umbanhowar, Julio M. Ottino, Richard M. Lueptow,* “A mapping method for distributive mixing with diffusion: Interplay between chaos and diffusion in time-periodic sine flow,” *Physics of Fluids* **25** (2013) 052102, doi:[10.1063/1.4803897](https://doi.org/10.1063/1.4803897).
24. Marissa K. Krotter,[†] [Ivan C. Christov](#), Julio M. Ottino, Richard M. Lueptow,* “Cutting and Shuffling a Line Segment: Mixing by Interval Exchange Transformations,” *International Journal of Bifurcation and Chaos* **22** (2012) 1230041, doi:[10.1142/S0218127412300418](https://doi.org/10.1142/S0218127412300418); arXiv:[1208.2052](https://arxiv.org/abs/1208.2052). * [Cover article](#).
- 23. [Ivan C. Christov](#),* Howard A. Stone, “Resolving a paradox of anomalous scalings in the diffusion of granular materials,” *Proceedings of the National Academy of Sciences of the USA* **109** (2012) 16012–16017, doi:[10.1073/pnas.1211110109](https://doi.org/10.1073/pnas.1211110109).
22. Florent Pignatel, Caroline Asselin,[†] Lucas Krieger,[†] [Ivan C. Christov](#), Julio M. Ottino, Richard M. Lueptow,* “Parameters and scalings for dry and immersed granular flowing layers in rotating tumblers,” *Physical Review E* **86** (2012) 011304, doi:[10.1103/PhysRevE.86.011304](https://doi.org/10.1103/PhysRevE.86.011304).
21. Ivan C. Christov, “Hidden solitons in the Zabusky–Kruskal experiment: Analysis using the periodic, inverse scattering transform,” *Mathematics and Computers in Simulation* **82** (2012) 1069–1078, doi:[10.1016/j.matcom.2010.05.021](https://doi.org/10.1016/j.matcom.2010.05.021); arXiv:[0910.3345](https://arxiv.org/abs/0910.3345).
20. Gabriel Juarez, [Ivan C. Christov](#), Julio M. Ottino, Richard M. Lueptow,* “Mixing by cutting and shuffling 3D granular flow in spherical tumblers,” *Chemical Engineering Science* **73** (2012) 195–207, doi:[10.1016/j.ces.2012.01.044](https://doi.org/10.1016/j.ces.2012.01.044).

19. [Ivan C. Christov](#),* P.M. Jordan, “Comments on: “Starting solutions for some unsteady unidirectional flows of a second grade fluid,” [Int. J. Eng. Sci. 43 (2005) 781],” *International Journal of Engineering Science* **51** (2012) 326–332, doi:[10.1016/j.ijengsci.2011.10.012](#); arXiv:[1111.4464](#).
18. Richard S. Keiffer, R. McNorton, P.M. Jordan, [Ivan C. Christov](#),* “Dissipative acoustic solitons under a weakly-nonlinear, Lagrangian-averaged Euler- α model of single-phase lossless fluids,” *Wave Motion* **48** (2011) 782–790, doi:[10.1016/j.wavemoti.2011.04.013](#).
- 17. [Ivan C. Christov](#), Julio M. Ottino, Richard M. Lueptow,* “From streamline jumping to strange eigenmodes: Bridging the Lagrangian and Eulerian pictures of the kinematics of mixing in granular flows,” *Physics of Fluids* **23** (2011) 103302, doi:[10.1063/1.3653280](#).
16. Ivan C. Christov, “Comments on: “Energetic balance for the Rayleigh–Stokes problem of an Oldroyd-B fluid” [Nonlinear Anal. RWA 12 (2011) 1],” *Nonlinear Analysis: Real World Applications* **12** (2011) 3687–3690, doi:[10.1016/j.nonrwa.2011.06.025](#); arXiv:[1107.2947](#).
15. [Ivan C. Christov](#), Richard M. Lueptow, Julio M. Ottino,* “Stretching and folding versus cutting and shuffling: An illustrated perspective on mixing and deformations of continua,” *American Journal of Physics* **79** (2011) 359–367, doi:[10.1119/1.3533213](#); arXiv:[1010.2256](#).
14. [Ivan C. Christov](#), C.I. Christov, “An improved formula for the frequency shift due to a variable phase speed,” *Journal of Physics A: Mathematical and Theoretical* **44** (2011) 112001, doi:[10.1088/1751-8113/44/11/112001](#).
- 13. Ivan C. Christov, “Stokes’ first problem for some non-Newtonian fluids: Results and mistakes,” *Mechanics Research Communications* **37** (2010) 717–723, doi:[10.1016/j.mechrescom.2010.09.006](#); arXiv:[1009.4416](#).
12. [Ivan C. Christov](#),* C.I. Christov, “Comment on “On a class of exact solutions of the equations of motion of a second grade fluid” by C. Fetecău and J. Zierrep (Acta Mech. 150, 135–138, 2001),” *Acta Mechanica* **215** (2010) 25–28, doi:[10.1007/s00707-010-0300-2](#); arXiv:[1003.2188](#).
11. [Ivan C. Christov](#),* P.M. Jordan, “On the Propagation of Second-Sound in Nonlinear Media: Shock, Acceleration and Traveling Wave Results,” *Journal of Thermal Stresses* **33** (2010) 1109–1135, doi:[10.1080/01495739.2010.517674](#).
10. [Ivan C. Christov](#), Julio M. Ottino, Richard M. Lueptow,* “Chaotic mixing via streamline jumping in quasi-two-dimensional tumbled granular flows,” *Chaos* **20** (2010) 023102, doi:[10.1063/1.3368695](#).
- 9. [Ivan C. Christov](#), Julio M. Ottino, Richard M. Lueptow,* “Streamline jumping: A mixing mechanism,” *Physical Review E* **81** (2010) 046307, doi:[10.1103/PhysRevE.81.046307](#).
8. Ivan Christov, “Internal solitary waves in the ocean: Analysis using the periodic, inverse scattering transform,” *Mathematics and Computers in Simulation* **80** (2009) 192–201, doi:[10.1016/j.matcom.2009.06.005](#); arXiv:[0708.3421](#).
7. [Ivan Christov](#), P.M. Jordan,* “Shock and traveling wave phenomena on an externally damped, non-linear string,” *International Journal of Non-Linear Mechanics* **44** (2009) 511–519, doi:[10.1016/j.ijnonlinmec.2008.12.004](#).
- 6. [Ivan Christov](#), Bojan Popov,* “New non-oscillatory central schemes on unstructured triangulations for hyperbolic systems of conservation laws,” *Journal of Computational Physics* **227** (2008) 5736–5757, doi:[10.1016/j.jcp.2008.02.007](#).
5. [Ivan Christov](#), P.M. Jordan,* “Shock bifurcation and emergence of diffusive solitons in a nonlinear wave equation with relaxation,” *New Journal of Physics* **10** (2008) 043027, doi:[10.1088/1367-2630/10/4/043027](#).
4. [Ivan Christov](#),* C.I. Christov, “Physical dynamics of quasi-particles in nonlinear wave equations,” *Physics Letters A* **372** (2008) 841–848, doi:[10.1016/j.physleta.2007.08.038](#); arXiv:[nlin/0612005](#).
- 3. [Ivan Christov](#), C.I. Christov, P.M. Jordan,* “Modeling weakly nonlinear acoustic wave propagation,” *The Quarterly Journal of Mechanics and Applied Mathematics* **60** (2007) 473–495, doi:[10.1093/qjmam/hbm017](#).
 - ▷ See also: Corrigendum and Addendum, *ibid.* **68** (2015) 231–233, doi:[10.1093/qjmam/hbu023](#).
2. [Ivan Christov](#), C.I. Christov, P.M. Jordan,* “Cumulative Nonlinear Effects in Acoustic Wave Propagation,” *CMES: Computer Modeling in Engineering & Sciences* **17** (2007) 47–54, doi:[10.3970/cmcs.2007.017.047](#).

1. Ivan Christov, P.M. Jordan,* C.I. Christov, “Nonlinear acoustic propagation in homentropic perfect gases: A numerical study,” *Physics Letters A* **353** (2006) 273–280, [doi:10.1016/j.physleta.2005.12.101](https://doi.org/10.1016/j.physleta.2005.12.101).

In Refereed Proceedings/Edited Volumes:

12. Aditya A. Ghodgaonkar,† Ivan C. Christov,* “Solving Nonlinear Parabolic Equations by a Strongly Implicit Finite Difference Scheme: Applications to the Finite Speed Spreading of Non-Newtonian Viscous Gravity Currents,” invited contribution to *Advanced Wave Mathematics II*, eds. T. Soomere, A. Berezovski, Springer Series on Mathematics of Planet Earth **6** (2019) 303–340, [doi:10.1007/978-3-030-29951-4_14](https://doi.org/10.1007/978-3-030-29951-4_14); [arXiv:1903.07568](https://arxiv.org/abs/1903.07568).
11. Vishal Anand,‡ Ivan C. Christov,* “On the Deformation of a Hyperelastic Tube Due to Steady Viscous Flow Within,” invited contribution to *Dynamical Processes in Generalized Continua and Structures*, eds. H. Altenbach, A. Belyaev, V. A. Eremeyev, A. Krivtsov, A. V. Porubov, Springer Series on Advanced Structured Materials **103** (2019) 17–35, [doi:10.1007/978-3-030-11665-1_2](https://doi.org/10.1007/978-3-030-11665-1_2); [arXiv:1810.05354](https://arxiv.org/abs/1810.05354).
10. Avadh Saxena, Ivan C. Christov,* Avinash Khare, “Higher-Order Field Theories: ϕ^6 , ϕ^8 and Beyond,” invited contribution to *A Dynamical Perspective on the ϕ^4 Model: Past, Present and Future*, eds. P. G. Kevrekidis, J. Cuevas-Maraver, Springer Series on Nonlinear Systems and Complexity **26** (2019) 253–279, [doi:10.1007/978-3-030-11839-6_12](https://doi.org/10.1007/978-3-030-11839-6_12); [arXiv:1806.06693](https://arxiv.org/abs/1806.06693).
9. R. V. Radomskiy, E. V. Mrozovskaya, V. A. Gani,* I. C. Christov, “Topological defects with power-law tails,” in *Proceedings of International Conference on Particle Physics and Astrophysics* (Moscow, Russian Federation), eds. M. Skorokhvatov, S. Rubin, Journal of Physics: Conference Series **798** (2017) 012087, [doi:10.1088/1742-6596/798/1/012087](https://doi.org/10.1088/1742-6596/798/1/012087); [arXiv:1611.05634](https://arxiv.org/abs/1611.05634).
8. Ivan C. Christov,* Richard M. Lueptow, Julio M. Ottino, Rob Sturman, “A Parametric Study of Mixing in a Granular Flow a Biaxial Spherical Tumbler,” *Dynamical Systems: Modelling*, ed. J. Awrejcewicz, Springer Proceedings in Mathematics & Statistics **181** (2016) 143–154, [doi:10.1007/978-3-319-42402-6_13](https://doi.org/10.1007/978-3-319-42402-6_13); [arXiv:1510.01751](https://arxiv.org/abs/1510.01751).
7. Ivan C. Christov, “Wave Solutions,” invited contribution in *Encyclopedia of Thermal Stresses* (2014), ed. R.B. Hetnarski, Springer, 6495–6506, [doi:10.1007/978-94-007-2739-7_33](https://doi.org/10.1007/978-94-007-2739-7_33); [arXiv:1208.3622](https://arxiv.org/abs/1208.3622).
6. Ivan Christov, Ilya D. Mishev, Bojan Popov, “Finite volume methods on unstructured Voronoi meshes for hyperbolic conservation laws,” in *Hyperbolic Problems: Theory, Numerics and Applications*, eds. E. Tadmor, J.-G. Liu, A.E. Tzavaras, Proceedings of Symposia in Applied Mathematics **67** (2009) 507–516.
5. I.C. Christov, C.I. Christov, “On the Inertial Force Experienced by a Solid Body Undergoing Rotation about Two Axes,” in *Proceedings of the 1st International Conference on Applications of Mathematics in Technical and Natural Sciences (Sozopol, Bulgaria)*, eds. M.D. Todorov, C.I. Christov, AIP Conference Proceedings **1186** (2009) 226–230, [doi:10.1063/1.3265333](https://doi.org/10.1063/1.3265333).
4. Ivan Christov, C.I. Christov, “The coarse-grain description of interacting sine-Gordon solitons with varying widths,” in *Dynamical Systems and Differential Equations: Proceedings of the 7th AIMS International Conference (Arlington, TX, USA)*, eds. X. Hou, X. Lu, A. Miranville, J. Su, J. Zhu, Discrete and Continuous Dynamical Systems (DCDS) Supplement (2009) 171–180, [doi:10.3934/proc.2009.2009.171](https://doi.org/10.3934/proc.2009.2009.171).
3. Ivan Christov, “Thermal shock waves under a Maxwell–Cattaneo model with temperature-dependent conductivity,” *Proceedings of The Eighth International Congress on Thermal Stresses* (2009), eds. M. Ostojca-Starzewski, P. Marzocca, vol. II, 525–528, [doi:10.13140/RG.2.1.4704.1047/1](https://doi.org/10.13140/RG.2.1.4704.1047/1).
2. James A. Hawkins, Alex Warn-Varnas, Ivan Christov, “Fourier, Scattering, and Wavelet Transforms: Applications to Internal Gravity Waves with Comparisons to Linear Tidal Data,” in *Nonlinear Time Series Analysis in the Geosciences: Applications to Climatology, Geodynamics and Solar-Terrestrial Physics*, eds. R.V. Donner, S.M. Barbosa, Springer Lecture Notes in Earth Sciences **112** (2008) 223–244, [doi:10.1007/978-3-540-78938-3_10](https://doi.org/10.1007/978-3-540-78938-3_10).
1. Stanley A. Chin-Bing, Alex C. Warn-Varnas, David B. King, Ivan Christov, “Using Ocean Acoustics to Improve Large Shallow-water Soliton Simulations,” *Proceedings of MTS/IEEE Oceans 2007 Conference* (2007) 1754–1758, [doi:10.1109/OCEANS.2007.4449377](https://doi.org/10.1109/OCEANS.2007.4449377).

Other:

15. Ivan C. Christov,* Howard A. Stone, “Non-Fickian macroscopic model of axial diffusion of granular materials in a long cylindrical tumbler,” e-Print; [arXiv:1902.01200](https://arxiv.org/abs/1902.01200).

14. Ivan C. Christov, “Comments on “Scattering Cancellation-Based Cloaking for the Maxwell–Cattaneo Heat Waves”,” e-Print; [arXiv:1908.02188](https://arxiv.org/abs/1908.02188).
13. [Ivan C. Christov](#),* Michel Destrade, “Preface: Mechanics from the 20th to the 21st Century: The Legacy of Gérard A. Maugin,” *Mechanics Research Communications* **93** (2018) 1–3, [doi:10.1016/j.mechrescom.2018.06.003](https://doi.org/10.1016/j.mechrescom.2018.06.003).
12. [Ivan C. Christov](#), Michail D. Todorov,* Sanichiro Yoshida, “Special issue of Wave Motion — “Mathematical modeling and physical dynamics of solitary waves: From continuum mechanics to field theory,”” *Wave Motion* **71** (2017) 1–4, [doi:10.1016/j.wavemoti.2016.09.007](https://doi.org/10.1016/j.wavemoti.2016.09.007).
11. [Ivan C. Christov](#),* Hari S. Viswanathan, “Introduction: energy and the subsurface,” *Philosophical Transactions of the Royal Society A* **374** (2016) 20150430, [doi:10.1098/rsta.2015.0430](https://doi.org/10.1098/rsta.2015.0430).
10. [Ivan Christov](#), Pedro Jordan, “Maxwell’s “other” equations,” *The Royal Society Publishing Blog* (September 22, 2015), <http://blogs.royalsociety.org/publishing/maxwells-other-equations/>.
9. Ivan Christov, “Kinematic Waves,” *LinkedIn Pulse* (August 11, 2015), <https://lnkd.in/ewdQEs5>.
8. Ivan C. Christov, “From Streamline Jumping to Strange Eigenmodes and Three-Dimensional Chaos: A Tour of the Mathematical Aspects of Granular Mixing in Rotating Tumblers,” *PhD Dissertation* (2011), Northwestern University, Evanston, Illinois.
7. Julio M. Ottino, Richard M. Lueptow, [Ivan C. Christov](#), “DynSyst_Special_Topics: A Dynamical Systems Approach to Mixing and Segregation of Granular Matter,” *Proceedings of the 2011 NSF Engineering Research and Innovation Conference*, January 4–7, 2011, Atlanta, Georgia.
6. [Ivan Christov](#), Ilya D. Mishev, Bojan Popov, “Finite Volume Methods on Unstructured Voronoi Meshes for Hyperbolic Conservation Laws,” Preprint [IAMCS-2008-030](#) (2008), Institute for Applied Mathematics and Computational Science, Texas A&M University.
5. [Ivan Christov](#), Bojan Popov, “A Jiang–Tadmor Scheme on Unstructured Triangulations,” Technical Report [ISC-06-05-MATH](#) (2006), Institute for Scientific Computation, Texas A&M University.
4. Jeff Baker, [Ivan Christov](#), Simona Dediu, Elana Fertig, Wanda Strychalski, “Properties of a Gradient Descent Algorithm for Active Vibration Control,” *Proceedings of the Twelfth Industrial Mathematical and Statistical Modeling Workshop for Graduate Students*, eds. A. Chertock, M.A. Haider, M.S. Olufsen, R.C. Smith, Technical Report [CRSC-TR06-23](#) (2006) 89–108, Center for Research in Scientific Computation, North Carolina State University.
3. Ivan Christov, “Multiscale Image Edge Detection,” *1.130/18.327, Spring 2004, Final Project* (2004), [doi:10.13140/RG.2.1.2213.7363](https://doi.org/10.13140/RG.2.1.2213.7363).
2. Ivan Christov, “Shock Waves in a Tube,” *MIT Undergraduate Journal of Mathematics* **7** (2005) 23–34.
1. Ivan Christov, “Integrating the Normal Curve,” *FOLIO: Literary Journal of the Louisiana School for Math Science and the Arts* (2002) 5–8, [doi:10.13140/RG.2.1.4441.9609](https://doi.org/10.13140/RG.2.1.4441.9609).

Grants & Funding:

Active:

- “Nonlinear Dynamics of Confined Interfaces: Beyond Linear Analysis and Towards Control”
 - ▷ Role: PI; estimated duration: Sept. 2020 to Aug. 2023.
 - ▷ Funding: NSF grant [CMMI-2029540](#), US\$387,724.
- “Microscale Fluid–Structure Interactions: Towards a Predictive Theory of Their Dynamic Response”
 - ▷ Role: PI; estimated duration: Aug. 2017 to Aug. 2021.
 - ▷ Funding: NSF grant [CBET-1705637](#), US\$299,460.
- “Controlling Particle Migration Using Geometry and Hydrodynamic”
 - ▷ Role: PI; estimated duration: Sept. 2017 to Aug. 2021.
 - ▷ Funding: ACS PRF grant PRF# 57371-DNI9, US\$110,000.

Completed:


- Richard P. Feynman Distinguished Postdoctoral Fellowship in Theory and Computing: “Mixing and Diffusion in Granular Flows”
 - ▷ Role: PI; Co-PIs: Eli Ben-Naim and R.E. Ecke (LANL); started July 2013, completed December 2015.
 - ▷ Funding: LANL LDRD grant 20130792PRD2, US\$621,000 (amount projected through June 2016); personal share: $\gtrsim 90\%$.
- Mathematical Sciences Postdoctoral Research Fellowship: “Particle dispersal in dense granular flows: Theory and experiment”
 - ▷ Role: PI; started Sept. 2011, completed June 2013 (formal completion Aug. 2015).
 - ▷ Funding: NSF grant [DMS-1104047](#), US\$135,000.

Awards, Honors & Other Recognitions:

- Recognized as part of the 2020 class (amongst 147 out of $\approx 71,000$) of “Outstanding Referees” by the American Physical Society for contributions to assessing manuscripts for publication in the APS journals (the *Physical Review*). <https://journals.aps.org/OutstandingReferees>
- Recognized as “Outstanding Reviewer” (amongst 52) by the journal *Physica Scripta* for 2019. <https://publishingsupport.iopscience.iop.org/questions/physica-scripta-2019-reviewer-awards/>
- Recognized amongst 119 (out of ≈ 452) “Outstanding Engineering Teachers from Spring 2019” by Purdue’s College of Engineering. http://tmnt-lab.org/gallery/outstanding_teachers_coe_spring19.pdf
- Recognized amongst 97 (out of ≈ 452) “Outstanding Engineering Teachers from Spring ’18” by Purdue’s College of Engineering. http://tmnt-lab.org/gallery/outstanding_teachers_coe_spring18.pdf
- Best Student Paper Award, 7th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory.
- Best Student Paper Award, 6th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory.
- Walter P. Murphy Fellowship for graduate study at Northwestern University (2007–2008, 2008–2009 and 2009–2010 academic years).
- Regents Fellowship for graduate study at Texas A&M University (2005–2006 academic year).

Teaching & Mentorship:

- Postdoctoral researchers mentored ($\downarrow \frac{1}{2}$):
 1. Dr. Federico Municchi (School of Mechanical Engineering, Purdue University, Nov. 2017–Nov. 2018).
 2. Dr. Kimberly A. Stevens Boster (School of Mechanical Engineering, Purdue University); co-mentored with Vitaliy L. Rayz (Weldon School of Biomedical Engineering, Purdue University); *Purdue Gilbreth Fellow* (Nov. 2018–Aug. 2018).
- Theses advised (as “major professor”):
 - ▷ PhD ($\downarrow \frac{1}{2}$):
 1. Vishal Anand (School of Mechanical Engineering, Purdue University); Defended: Fall 2020; Graduated: Summer 2020; Thesis: “Microscale Fluid–Structure Interactions between Viscous Internal Flows and Elastic Structures.”
 2. Daihui Lu (School of Mechanical Engineering, Purdue University).
 3. Tanmay C. Shidhore (School of Mechanical Engineering, Purdue University); co-advised with Vitaliy L. Rayz (Weldon School of Biomedical Engineering, Purdue University).
 4. Jieli Yang (Department of Mathematics, Purdue University); co-advised with Suchuan (Steven) Dong (Department of Mathematics, Purdue University).


5. Zongxin Yu (School of Mechanical Engineering, Purdue University); *Purdue Ross Fellow*.
 6. Xiaojia Wang (School of Mechanical Engineering, Purdue University); *Purdue Ross Fellow*.
- ▷ MSME ():
1. Tanmay C. Inamdar (School of Mechanical Engineering, Purdue University); Defended/Graduated: Spring 2018; Thesis “Unsteady Fluid–Structure Interactions in Soft-Walled Microchannels.”
 2. Aditya Avinash Ghodgaonkar (School of Mechanical Engineering, Purdue University); Defended/Graduated: Spring 2019; Thesis “Numerical Methods for Studying Self-similar Propagation of Viscous Gravity Currents.”
 3. Pranay P. Nagrani (School of Mechanical Engineering, Purdue University); co-advised with Amy Marconnet (School of Mechanical Engineering, Purdue University).
 4. Tanmay C. Shidhore (School of Mechanical Engineering, Purdue University); Defended: Fall 2017; Graduated: Spring 2018; Thesis: “Computational Analysis of Fluid-Structure Interactions in Shallow, Deformable Microchannels.”
 5. Mengying Wang (School of Mechanical Engineering, Purdue University); Defended/Graduated: Spring 2018; Thesis “Mixing by Cutting and Shuffling a Line Segment: The Effect of Incorporating Diffusion.”
- Thesis committee membership and/or external examiner (not “major professor”):
 - ▷ PhD: 15 at Purdue University, 2 at Monash University, 1 at New Jersey Institute of Technology, 1 at Queensland University of Technology.
 - ▷ MSME: 5 at Purdue University.
 - Undergraduates mentored at Purdue University:
 - ▷ Mechanical Engineering Summer Projects (special program during Summer 2020 due to COVID-19): co-led (with Dr. Stevens Boster) a 6-student team on a 10-week project on “Computational Cardiovascular Fluid Mechanics,” which combines hands-on remote learning with research experience.
 - ▷ Summer Undergraduate Research Fellowship (SURF) program: Julia Meyer (2017), Zihao Lin & Zoë S. Penko (2018), Masashi Nishiguchi & Valeria M. Tellez (2019).
 - ▷ Purdue–India Initiative Undergraduate Research Experience (PURE): Sanketh Saravanan (2017), Joshua David JR (2018) leading to publication #52, Sanjan C. Muchandimath, leading to publication #58 (2019).
 - ▷ S.N. Bose Scholars (SERB-IUSSTF): Pranay P. Nagrani (2018) leading to publication #55, Ahmad Faraz Badar (2019).
 - ▷ *Ad-hoc* and/or for undergraduate research credit: Sibi Chandrasekar (Spring 2017, Spring 2018, Fall 2018); Zihao Lin (Fall 2018, Spring 2019—*Bottomley Research Scholar*); Julia Meyer (Fall 2017, Spring 2018, Summer 2018, Fall 2018, Spring 2019—*Purdue OUR Scholar*); Shrihari Pande (Fall 2020); Usamah Zaman (Fall 2018).
 - Undergraduates mentored elsewhere:
 - ▷ Los Alamos National Laboratory, post-baccalaureate student employee: co-directed research on collective coordinate theory of interactions of compactons (Spring 2014–Summer 2015).
 - ▷ Center for Nonlinear Studies, summer undergraduate research assistant: co-directed research leading to publication #41 (Summer 2014).
 - ▷ Princeton University, visiting MS student: co-directed research leading to publication #46 (Summer 2012).
 - ▷ Northwestern University, Murphy Institute Scholar: co-supervised research leading up to publication #24 (2009–2010 and 2010–2011 academic years).
 - Courses taught at Purdue University:
 - ▷ ME 309 – Fluid Mechanics (Spring 2017, Fall 2017, Spring 2018 – *Lead*, Fall 2019, Spring 2020 – *Lead*).
 - ▷ ME 509 – Intermediate Fluid Mechanics (Spring 2016, Fall 2016, Fall 2018, Fall 2020).
 - ▷ ME 610 – Boundary Layer Theory (Spring 2019).

Talks & Presentations:

(N.B.: This list excludes co-authored talks given by others, which can be found at christov.tmnt-lab.org/talks.html#coauth.)

Invited Seminars & Colloquia:

- **September 11, 2020** “Multiphysics problems at low Reynolds number: From deformable channels to spinning droplets,” Frontiers in Mechanical Engineering and Sciences: A Multi-University Webinar Series, virtual.
- **June 26, 2020** “Soft Hydraulics: Mathematical Modeling of Flows in Deformable Conduits,” *Invited Plenary*, Twelfth Conference of the Euro-American Consortium for Promoting the Application of Mathematics in Technical and Natural Sciences, ~~Albena, Bulgaria~~ virtually on-line (*due to COVID-19*).
- **February 21, 2020** “Soft hydraulics: The theory of microscale fluid-induced deformation,” MechSE Fluid Mechanics Seminar, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, Illinois.
- **September 19, 2019** “Stokes flows in deformable conduits: Hydrodynamic resistance beyond Poiseuille,” *Ad-hoc* seminar, Mathematical Institute, University of Oxford, United Kingdom.
- **May 1, 2019** “Reduced-order modeling of unsteady microscale fluid–structure interactions,” Seminar in Applied Mathematics, Department of Mathematics & Statistics, Texas Tech University, Lubbock, Texas.
- **April 30, 2019** “From microchannels to blood vessels: A mathematical modeling perspective on flow in soft conduits,” Colloquium, Department of Mathematics & Statistics, Texas Tech University, Lubbock, Texas.
- **October 19, 2018** “From microchannels to blood vessels: A mathematical modeling perspective on flow in soft conduits,” Applied Math / Applied Math Lab Seminar, Courant Institute of Mathematical Sciences, Department of Mathematics, New York University, New York, New York.
- **August 31, 2018** “From microchannels to blood vessels: A mathematical modeling perspective on flow in soft conduits,” Colloquium, Department of Mathematics, University of Nebraska–Lincoln, Lincoln, Nebraska.
- **August 30, 2018** “Reduced-order modeling of unsteady microscale fluid–structure interactions,” Continuum Mechanics Seminar, Department of Mathematics, University of Nebraska–Lincoln, Lincoln, Nebraska. UNL Continuum Mechanics Seminar
- **May 8, 2018** “Microscale fluid–structure interactions: Theory and simulation of static response,” Microfluidics Seminar, National Institute of Standards and Technology (NIST), Gaithersburg, Maryland.
- **November 3, 2017** “Transport Phenomena in Flows of Granular Materials,” Center for Particulate Products and Processes Seminar, Purdue University, West Lafayette, Indiana.
- **October 12, 2017** “Multiple-scale asymptotics of plane waves in media with variable phase speed,” Seminar, Department of Physics, Clark Atlanta University, Atlanta, Georgia.
- **October 9, 2017** “Mathematical and computational modeling of microfluidic fluid–structure interactions,” Seminar, Department of Mathematics, Savannah State University, Savannah, Georgia.
- **April 20, 2017** “Topics in low Re flow: From microfluidic fluid–structure interactions to multiphase flow in hydraulic fractures,” Special Seminar, Department of Mechanical & Industrial Engineering, New Jersey Institute of Technology, Newark, New Jersey.
- **December 2, 2016** “Topics in low Re flow: From microfluidic fluid–structure interactions to proppant transport in hydraulic fractures,” Computational & Applied Mathematics Lunch Seminar, Department of Mathematics, Purdue University, West Lafayette, Indiana.

 For talks prior to 2016 (year of my first faculty appointment), please consult the historical records here: <http://christov.tmnt-lab.org/talks.html#y2015> and scroll down.

Conferences:

- **April 5, 2020** (Contributed, *cancelled due to COVID-19*) Vishal Anand, Ivan Christov, Tanmay C. Shidhore, Xiaojia Wang, “Mathematical modeling of viscous flows in deformable conduits,” Special Session on Recent Advances in Modeling, Computational Methods, and Simulations of Physical/Biological Systems, 2019 Spring Central Sectional Meeting of the American Mathematical Society, West Lafayette, Indiana.
- **March 2, 2020** (Contributed, *cancelled due to COVID-19*) Vishal Anand, Ivan Christov, Tanmay C. Shidhore, Xiaojia Wang, “Soft hydraulics: Theory of flow in deformable microchannels,” March Meeting 2020 of the American Physical Society, Denver, Colorado.
- **February 4, 2020** (Invited) “Soft hydraulics: Hydrodynamic resistances beyond Hagen–Poiseuille,” Research Workshop of the Israel Science Foundation on Micro-Swimmers and Soft-Robotics, Technion, Haifa, Israel.
- **September 16, 2019** (Contributed) “Stokes flows in deformable conduits: Hydrodynamic resistance beyond Poiseuille,” Poster Session, Stokes²⁰⁰: A celebration of the remarkable scientific achievements of Sir George Gabriel Stokes two hundred years after his birth, Pembroke College, Cambridge, United Kingdom.
- **August 7, 2019** (Invited) “Fundamental aspects of continuum modeling of granular diffusion and dispersion in tumbler flows,” Blending & Segregation Forum, Purdue University, West Lafayette, Indiana.
- **June 14, 2019** (Contributed) “1D model of unsteady microchannel fluid–structure interactions: a viscous, rectilinear Starling resistor?” Poster Session, Mathematical Fluids, Materials and Biology: A conference in honor of the 60th Birthday of Michael J. Shelley, University of Michigan, Ann Arbor, Michigan.
- **June 10, 2019** (Contributed) “Microscale Fluid–Structure Interactions: Towards a Predictive Theory,” Harrington Symposium: Physics of Microfluidics, Austin, Texas.
- **May 19, 2019** (Invited) Tanmay C. Inamdar, Ivan C. Christov, “Complex Dynamics of Unsteady Microchannel Fluid–Structure Interactions: 1D Model,” Minisymposium on Applied Mathematical Techniques for Fluid Flow Across Scales, 2019 SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah.
- **May 9, 2019** (Invited) “Flows in deformable conduits: Towards a theory of the response of soft microdevices,” Flow Assurance Conference, Purdue Process Safety & Assurance Center (P2SAC) 2019 Spring Conferences, West Lafayette, Indiana.
- **March 13, 2019** (Invited) “Perturbative Theory of Flow-Driven Deformation of Small Pores,” Minisymposium on Fracture Formation Coupled with Fluid Flow and Wave Propagation in the Porous Media, 2019 SIAM Conference on Mathematical & Computational Issues in the Geosciences, Houston, Texas.
- **January 4, 2019** (Contributed) Ivan C. Christov, Robert J. Decker, A. Demirkaya, Vakhid A. Gani, P. G. Kevrekidis, R. V. Radomskiy, “Long-range interactions of kinks,” Poster Session, Dynamics Days 2019, Evanston, Illinois.
- **November 18, 2018** (Contributed) Tanmay C. Inamdar, Ivan C. Christov, “A 1D model for unsteady fluid–structure interactions in a soft-walled microchannel,” 71st Annual Meeting of the American Physical Society’s Division of Fluid Dynamics, Atlanta, Georgia.
- **January 4, 2018** (Contributed) Mengying Wang, Ivan C. Christov, “Cutting and Shuffling with Diffusion: Cut-offs in Interval Exchange Maps,” Poster Session, Dynamics Days 2018, Denver, Colorado.
- **December 9, 2017** (Invited) Ivan C. Christov, Tanmay C. Shidhore, “Low Reynolds Number Fluid-Structure Interactions: Modeling the Response of Soft Microfluidic Devices,” Minisymposium on Analysis, Control and Inverse Theory of Flows, Material Structures, Acoustics, and Their Interactions, 2017 SIAM Conference on Analysis of Partial Differential Equations, Baltimore, Maryland.
- **June 24, 2017** (Invited) “Traveling Waves in Fluids: Kink Solutions and Bifurcations with Respect to the Wave Speed,” Minisymposium “Nonlinear wave dynamics of generalized continua” (in memory of E. Aero and G. Maugin), XLV International Summer School-Conference “Advanced Problems in Mechanics,” Saint Petersburg, Russian Federation.
- **May 21, 2017** (Invited) “Traveling Waves in Fluids: Bifurcations with Respect to the Wave Speed,” Minisymposium on Exotic Bifurcations in Fluid and Granular Dynamics, 2017 SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah.

- **November 20, 2017** (Contributed) Ivan C. Christov, Tanmay C. Shidhore, “Static response of deformable microchannels,” 70th Annual Meeting of the American Physical Society’s Division of Fluid Dynamics, Denver, Colorado.
- **February 27, 2017** (Invited) Ivan C. Christov, Tanmay C. Shidhore, “Modeling Flow Rate–Pressure Drop Relations of Soft Micro-Fluidic Devices,” Minisymposium on Small-scale flows with industrial applications: Modeling and simulations, 2017 SIAM Conference on Computational Science and Engineering, Atlanta, Georgia.
- **November 22, 2016** (contributed) “Mathematical analysis of electromigration dispersion fronts, 69th Annual Meeting of the American Physical Society’s Division of Fluid Dynamics, Portland, Oregon.
- **October 08, 2016** (Invited) “Self-similar regimes of gravity-driven spreading of viscous liquids in model heterogeneous porous media,” Special Session on Aspects of PDE Arising from Modeling of the Flows in Porous Media, 2016 Fall Western Sectional Meeting of the American Mathematical Society, Denver, Colorado.
- **July 17, 2016** (Invited) “On PDEs with Hamiltonian structure: From kinks in higher-order field theory to peakon-compactons,” Mini-Symposium on “Mathematics of Nonlinear Phenomena,” VI International Conference “Frontiers of Nonlinear Physics,” Nizhny Novgorod, Russian Federation.
- **July 4, 2016** (Invited) Zhong Zheng, Bo Guo, Ivan C. Christov, Michael A. Celia, Howard A. Stone, “Flow regimes for fluid injection into a confined porous medium,” Special Session on New Developments in Porous Media, 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, Florida.
- **July 4, 2016** (Invited) Z. Zheng, Ivan C. Christov, H. A. Stone, “Self-similar viscous gravity currents in heterogeneous porous media: Second-kind solutions,” Special Session on New Developments in Porous Media, 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, Florida.
- **May 12, 2016** (Contributed) Zhong Zheng, Ivan Christov, Howard Stone, “Self-similar viscous gravity currents in heterogeneous porous media: Second-kind solutions,” 8th International Conference on Porous Media & Annual Meeting (InterPore), Cincinnati, Ohio.
- **April 3, 2016** (Invited) “On PDEs with Hamiltonian structure: From kinks in higher-order field theory to peakon-compactons,” Workshop on Nonlinear Dynamics of Many Body Systems, Buffalo, New York.

▲ For talks prior to 2016 (year of my first faculty appointment), please consult the historical records here: <http://christov.tmnt-lab.org/talks.html#y2015> and scroll down.

Professional Development:

- Short Term Visitor at the Department of Mechanical Engineering at the Indian Institute of Technology Kharagpur, hosted by Dr. Jeevanjyoti Chakraborty, under a grant from the Scheme for Promotion of Academic and Research Collaboration (SPARC) from the Government of India (PIs Chakraborty and Christov) (Dec. 2019).
- 1½-day NSF ENG CAREER Proposal Writing Workshop, Washington, DC (Apr. 1–2, 2019).
- 1-day Purdue workshop on “Strategies to Attract and Support URM Graduate Students” (Apr. 19, 2018).
- 1½-day workshop on “Effective College Teaching,” by R. Felder and R. Brent (Mar. 2–3, 2016).
- 31th Annual Workshop on Mathematical Problems in Industry at the University of Delaware (June 22–26, 2015); [Report](#).
- 30th Annual Workshop on Mathematical Problems in Industry at the New Jersey Institute of Technology (Jun. 23–27, 2014); [Report](#).
- Institute for Mathematics and its Applications Special Workshop on Careers and Opportunities in Industry for Mathematical Scientists (Apr. 7–9, 2014).
- 29th Annual Workshop on Mathematical Problems in Industry at the Worcester Polytechnic Institute (June 17–21, 2013); [Report](#).
- Short Term Visitor at the Oxford Centre for Collaborative Applied Mathematics (OCCAM) at the University of Oxford, hosted by Dr. I.M. Griffiths (Sept. 2012).

- 28th Annual Workshop on Mathematical Problems in Industry at the University of Delaware (June 11–15, 2012); [Report](#).
- International Workshop on Physics of Mixing at the Lorentz Center in Leiden, The Netherlands (Jan. 24–28, 2011).
- NSF/CBMS Regional Conference in the Mathematical Sciences on Recent Advances in the Numerical Approximation of Stochastic PDEs at the Illinois Institute of Technology (Aug. 9–13, 2010).
- 26th Annual Workshop on Mathematical Problems in Industry at Rensselaer Polytechnic Institute (June 14–18, 2010); [Report](#).
- 7th Annual Graduate Student Mathematical Modeling Camp at Rensselaer Polytechnic Institute (Jun. 8–11, 2010); [Report](#).
- Institute for Mathematics and its Applications (IMA) Workshop on Transport and Mixing in Complex and Turbulent Flows (Apr. 12–16, 2010).
- 12th Industrial Mathematical & Statistical Modeling Workshop for Graduate Students at the North Carolina State University (Jul. 24–Aug. 1, 2006).
- Louisiana State University Workshop on Harmonic Analysis and Fractal Geometry (Feb. 24–26, 2006).
- Institute for Mathematics and its Applications (IMA) Workshop on New Mathematics and Algorithms for 3-D Image Analysis (Jan. 9–12, 2006).
- Summer Undergraduate Research Fellow at the Laser Interferometer Gravitational Wave Observatory (LIGO), Livingston (Jun. 2002–Aug. 2002).

Service & Outreach:

- Service towards Purdue University: Mechanical Engineering Undergraduate Curriculum Committee (Fall 2018–present); Fluid Mechanics Area Exam Committee ($\times 4$); Mechanical Engineering Strategic Plan Work Group 3 (Fall 2017); Various *ad hoc* tasks, including reviewer for internal fellowships.
- Service towards the scientific community: reviewer of scientific manuscripts, book proposals and grant proposals.
 - ▷ Reviewed manuscripts for 100+ journals (on *ad hoc* basis). Regularly ($>$ once/year) for *Journal of Fluid Mechanics*, *Physical Review E*, *Physical Review Fluids*, *Physical Review Letters*, *Proceedings of the Royal Society A*, *Soft Robotics*, *Water Resources Research*, amongst others.
 - ▷ Publons profile: [559425](#); 290+ verified reviews (**N.B.** Publons counts revisions as separate records).
 - ▷ Reviewer for *Mathematical Reviews* database of the American Mathematical Society (MathSciNet).
 - ▷ Reviewed 9 book proposals (on *ad hoc* basis) for Cambridge University Press, CRC Press (Taylor & Francis Group), Springer Science+Business Media.
 - ▷ Reviewed grant proposals (on *ad hoc* basis) for Army Research Office, American Chemical Society Petroleum Research Fund (multiple), European Research Council, FWF Austrian Science Fund, FONDECYT–Chilean National Science and Technology Commission, Israeli Science Foundation (multiple), Israeli Ministry of Science and Technology (MOST), Ministry of Education and Science of the Republic of Kazakhstan (multiple), Natural Sciences and Engineering Research Council of Canada (NSERC), National Science Foundation (multiple Proposals Review Panels, Graduate Research Fellowship Program (virtual) Panel, Mail Reviewer), Pazy Foundation.
- Service towards the scientific community: contributed to the transfer of knowledge and its wider dissemination.
 - ▷ Co-organizer (with A. Marconnet) of a focus session entitled “Understanding Thermal Transport in Flows of Dense Suspensions” at the 73rd Annual Meeting of the Division of Fluid Dynamics of the American Physical Society.
 - ▷ Co-organizer (with V. Rayz and A. Roldán-Alzate) of a minisymposium entitled “Multi-Modality Analyses of Blood Flow” at the joint 14th World Congress on Computational Mechanics (WCCM XIV) and 8th European Congress on Computational Methods in Applied Science and Engineering (ECCOMAS 2020) (*moved to virtual in January 2021 due to COVID-19*); <https://www.wccm-eccomas2020.org/frontal/MSList.asp>.

- ▷ Co-organizer (with A. Chowdhury) of a special session entitled “Advances in Mathematical Modeling, Analysis and Numerical Simulation of Particulate Suspensions and Related Multiphase Flows” at the 2020 Spring Central Sectional Meeting of the American Mathematical Society (*cancelled due to COVID-19*); http://www.ams.org/meetings/sectional/2280_program_ss32.html.
 - ▷ Co-organizer (with P. Sanaei) of a focus session entitled “Microflows Meet Soft Matter: Compliance, Growth, Instabilities and Beyond” at the American Physical Society’s March Meeting 2020 (*cancelled due to COVID-19*); <http://meetings.aps.org/Meeting/MAR20/Session/A31> and <http://meetings.aps.org/Meeting/MAR20/Session/B31>.
 - ▷ Organizer of a minisymposium entitled “Modeling and Simulation of Fluid–Structure Interactions of Internal Flows in Soft Conduits” at the 2019 SIAM Conference on Applications of Dynamical Systems; http://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=66654.
 - ▷ Co-organizer (with F. Municchi) of a focus session entitled “The Physics of Microscale Fluid Structure Interactions: Fully Coupled Flow and Deformation Mechanics” at the 71st Annual Meeting of the Division of Fluid Dynamics of the American Physical Society; <http://meetings.aps.org/Meeting/DFD18/Session/A04> and <http://meetings.aps.org/Meeting/DFD18/Session/D04>.
 - ▷ Co-organizer (with D. Blackmore and A. Rahman) of a minisymposium entitled “Exotic Bifurcations in Fluid and Granular Dynamics” at the 2017 SIAM Conference on Applications of Dynamical Systems; http://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=61598 (2 parts).
 - ▷ Head of organizing committee for the Center of Nonlinear Studies Workshop on Grand Challenges in Geological Fluid Mechanics, Santa Fe, New Mexico, Sept. 2–4, 2015; <http://cnls.lanl.gov/geofluid>.
 - ▷ Co-organizer (with M.D. Todorov and S. Yoshida) of a special session entitled “Mathematical Modeling and Physical Dynamics of Solitary Waves: From Continuum Mechanics to Field Theory” at the 9th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, Georgia.
 - ▷ Co-organizer (with P.M. Jordan and M.D. Todorov) of a special session entitled “Modeling and Wave Phenomena in Nonlinear Continuum Mechanics” at the 8th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, Georgia.
 - ▷ Co-organizer (with R. Sturman) of a minisymposium entitled “Piecewise Isometries: Applications and Theory” at the 2011 SIAM Conference on Applications of Dynamical Systems; http://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=12555.
 - ▷ Co-organizer (with P.M. Jordan and M.D. Todorov) of a special session entitled “Recent trends in nonlinear wave phenomena—Achievements and challenges: A symposium dedicated to Prof. Christo I. Christov on the occasion of his 60th birthday” at the 7th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, Georgia.
- Service towards the scientific community: contributed to the integration of knowledge.
 - ▷ Guest co-editor (with M. Destrade) of a special issue in *Mechanics Research Communications* in memory of Gérard A. Maugin; <https://www.sciencedirect.com/journal/mechanics-research-communications/vol/93>.
 - ▷ Guest co-editor (with M.D. Todorov and S. Yoshida) of a special issue in *Wave Motion* entitled “Mathematical Modeling and Physical Dynamics of Solitary Waves: From Continuum Mechanics to Field Theory”; <https://www.sciencedirect.com/journal/wave-motion/vol/71>.
 - ▷ Guest co-editor (with H.S. Viswanathan) of a special issue in *Philosophical Transactions of the Royal Society A* entitled “Energy and the subsurface”; <http://rsta.royalsocietypublishing.org/content/374/2078/>.
 - Contributed to broadening the participation of groups underrepresented in STEM.
 - ▷ Member of the mentor pool for underrepresented students under The National Alliance for Doctoral Studies in the Mathematical Sciences (May 2018–present); <https://mathalliance.org/mentor/ivan-christov/>.
 - ▷ Performed outreach and recruitment at Savannah State and Clark Atlanta Universities (HBCUs) under the Purdue Engineering’s “Pathways to the Professorate” initiative (Oct. 2017).
 - ▷ Mentor for Boston public schools’ McNair Science and Technology Program (Sept. 2002–June 2003).
 - Session chair at

- ▷ the 63rd, 69th, 70th, 71st and 72nd Annual Meetings of the Division of Fluid Dynamics of the American Physical Society;
 - ▷ the VI International Conference “Frontiers of Nonlinear Physics”;
 - ▷ the 2014 Western Spring Sectional Meeting of the American Mathematical Society.
- Member of the Scientific Program Committee of the 8th (March 25–28, 2013) and 9th (April 1–4, 2015) IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, Georgia.
 - Member of the colloquium organizing committee for the Center for Nonlinear Studies at the Los Alamos National Laboratory (2014, 2015 fiscal year terms).
 - Member of the Los Alamos Postdoctoral Association’s career committee (2014 fiscal year term).
 - Judge at Chicago Public Schools’ Science and Math Fairs (2010), Event Supervisor at Science Olympiad—Wilbur Wright College Regional Tournament (2011).
 - Elected Member-at-Large of the American Physical Society’s Forum on Graduate Student Affairs (2011, 2012 calendar years term).
 - Elected Student Representative of the American Physical Society’s Prairie Section (2010 calendar year term).
 - Taught 4-hour seminar course entitled “Chaos in Simple Systems” at the annual MIT Splash weekend for high school students (Nov. 23, 2003).
 - Taught 5-hour seminar course entitled “Chaos: An Introduction to Dynamical Systems” at the annual MIT Splash weekend for high school students (Nov. 23–24, 2002).

Professional Memberships:

- American Physical Society (APS), member, 2006–present.
- Society for Industrial and Applied Mathematics (SIAM), member, 2006–present.
- American Mathematical Society (AMS), member, 2005–2007, 2012–present.