

Aleksandar Donev

Associate Professor of Mathematics
Courant Institute of Mathematical Sciences, New York University, New York, NY
E-mail: donev@courant.nyu.edu ; Web: <http://cims.nyu.edu/~donev>
Phone: (212) 992-7315; Fax: (212) 995-4121

1 Education and Degrees

- September 2006* **Princeton University**, Princeton, NJ
Ph.D., Program in Applied and Computational Mathematics
Dissertation title: *Jammed Packings of Hard Particles*
Advisor: Professor Salvatore Torquato, Chemistry Department
- May 2001* **Michigan State University**, East Lansing, MI
Bachelor of Science, Physics
Honors (GPA 4.0), with one semester of graduate Teaching Assistant fellowship

2 Awards and Grants

- Sept 2017-Dec 2017*
Simons Fellow in Mathematics
Mathematics and Physical Sciences, Simons Foundation
- Sept 2017-Aug 2022*
RTG Grant DMS-1646339 “Research Training Group in Mathematical Modeling and Simulation”
Computational and Applied Mathematics, DMS, National Science Foundation
- Sept 2017-Aug 2020*
Grant PMP-1706562 “Magnetic microrollers as a platform for active transport”
Particulate and Multiphase Processes, ENG/CBET/PMP, National Science Foundation
- July 2014-June 2017*
Grant DMS-1418706 “Fluctuating Hydrodynamics of Suspensions of Rigid Bodies”
Computational and Applied Mathematics, DMS, National Science Foundation
- July 2012-June 2017*
Early Career Research Award
Applied Mathematics, Office of Science, Department of Energy (DOE)
- June 2012-June 2015*
Young Investigator Research Award
Computational Mathematics, Air Force Office of Scientific Research (AFOSR)
- June 2011-June 2014*
Grant DMS-1115341 “Computer simulations of giant fluctuations in mixing fluids”
Computational and Applied Mathematics, DMS, National Science Foundation
- August 2009* **Luis W. Alvarez Postdoctoral Fellowship**
Lawrence Berkeley National Laboratory, Berkeley, CA

August 2006 **Lawrence Postdoctoral Fellowship**
Lawrence Livermore National Laboratory, Livermore, CA

2005-2006 **Ray Grimm Memorial Prize** in Computational Physics
Princeton University, Princeton, NJ

3 Work and Research Experience

Sept 2015 - present

Associate Professor of Mathematics, New York University, New York, NY

August 2010 - August 2015

Assistant Professor of Mathematics, New York University, New York, NY

Courant Institute of Mathematical Sciences

Teaching: Graduate level Numerical Methods, Scientific Computing, seminar on Coarse-Grained Models of Materials

Research: Fluctuating hydrodynamics [46, 40, 47, 38, 36, 35, 34, 48, 43, 44, 56, 50, 53, 55, 51, 57, 54, 61, 58, 68, 69], fluid-structure coupling [49, 37, 45, 39, 60, 52, 59, 62], computational fluid dynamics [42, 56, 53, 60], stochastic differential equations and Brownian Dynamics [41, 38, 44, 67, 71, 70, 63], active particle suspensions [59, 66, 65, 71, 64]

Funding: NSF, DOE, AFOSR

August 2009 - July 2010

Luis W. Alvarez Postdoctoral Fellow

Lawrence Berkeley National Laboratory, Berkeley, CA

Center for Computational Sciences and Engineering (<https://ccse.lbl.gov>)

Supervisor: Dr. John Bell

Research project: Particle, continuum and hybrid algorithms for fluctuating hydrodynamics [33, 31, 28]

August 2006 - July 2009

Distinguished Lawrence Postdoctoral Fellow

Lawrence Livermore National Laboratory, Livermore, CA

High Performance Computational Materials Science and Chemistry Group

Supervisors: Dr. Vasily Bulatov and Dr. Berni Alder

Research projects: Irradiation damage in metals and alloys [32, 29], Hydrodynamics of polymer chains in solution [26, 27, 30], Parallel event-driven Kinetic Monte Carlo algorithms [25]

September 2001 - June 2006

Graduate Assistant in Research, Princeton University, Princeton, NJ

Princeton Institute for the Science and Technology of Materials

Advisor: Professor Salvatore Torquato, Chemistry Department

Research projects: Jammed packings of hard particles (primary) [20, 24, 10, 5, 15, 8, 16, 18, 13, 23, 22, 7, 14, 9, 11, 21, 19], Design of multifunctional materials via topology optimization (secondary) [4, 17, 6, 12, 3]

September 1999 - August 2001

Research and Teaching Assistant, Michigan State University, East Lansing, MI
Condensed Matter Theory, Department of Physics and Astronomy

Advisor: Professor Phillip M. Duxbury, Department of Physics and Astronomy

Research project: Convex network optimization for grain-boundary materials [2, 1]

Duties: Teaching assistant for Physics Computations and Computational Physics

4 Mentoring

Undergraduate Mentored research projects of undergraduate students Josh Burton (won Senior Thesis Prize, Princeton University, 2005), Jack Amadeo (S.U.R.E. summer program, Courant, Summer 2011), Courant summer visitors Yifei Sun (Summer 2012) and Jason Kaye (Summer 2013),

both now graduate students at Courant, as well as summer research student Qiaoyu Yang (Summer 2015), now a graduate student at Berkeley, as well as NYU MRSEC REU student Patrick Mooney (Summer 2016, U of Missouri).

- Graduate* Mentored and supervised graduate students Monica Skoge (Princeton, 2005) and Anton de la Fuente (Lawrence Berkeley Labs, 2009), visiting students Florencio Balboa (2012, Courant) and Jaime Arturo de la Torre (2013, Courant), Thomas Fai (Courant), as well as several Courant master's thesis. At Courant, advised student Steven DeLong (obtained Ph.D. in May 2015 under my supervision). Presently advising Courant Ph.D. student Yun Bill Bao (expected to graduate Spring 2017). Co-advising Northwestern graduate student Brennan Sprinkle with Neelesh Patankar (expected to graduate 2018).
- Postdoctoral* Supervised Courant postdoctoral researchers Mingchao Cai (2012-2013), Amneet Bhalla (2013), Amit Kumar Bhattacharjee (2013-2015), Florencio Balboa (2014-2017), as well as Courant Instructors Bakytzhan Kallemov (2013-2015) and Blaise Delmotte (since Fall 2015).

5 Selected Invited Presentations

- **Invited talk** at the CECAM workshop on State of the art in mesoscale and multiscale modeling, Dublin, Ireland, June 2017.
- **Invited talk** at the conference Modeling Complex Fluids and Gels for Biological Applications, Salt Lake City, UT, May 2017.
- **CSE17**, SIAM Conference on Computational Science and Engineering, Atlanta, GE, March 2017
Organized a two-session minisymposium on hydrodynamics at small scales
- **Invited talk** at the workshop on Spatially Distributed Stochastic Dynamical Systems in Biology, Newton Institute, Cambridge, June 2016.
- **MMS16** SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 2016
Organized a two-session minisymposium on Numerical Methods for Low Reynolds Number Suspensions of Passive and Active Particles
- **Invited talk** at the CECAM workshop on Hydrodynamic Fluctuations in Soft-Matter Simulations, February 9-12, Prato, Italy
- **Invited talk** at the CECAM workshop on Molecular and chemical kinetics, September 7-9, 2015, Berlin, Germany
- **Invited talk** at the 7th International Workshop on Nonequilibrium Thermodynamics, Hilvarenbeek, The Netherlands, July 2015
- **Plenary talk** at CECAM workshop Molecular hydrodynamics meets fluctuating hydrodynamics, 10-14 May 2015, Madrid, Spain
- **CSE15**, SIAM Conference on Computational Science and Engineering, Salt Lake City, UT, March 2015
Organized a two-session minisymposium on hydrodynamics at small scales
- **Invited talk** at workshop on Multiscale simulation methods for soft matter systems, 6-8 October 2014, Mainz, Germany
- **Invited talk** at workshop on Multiscale Computational Methods in Materials Modeling (MCM3), 18-20 June 2014, ICMS, Edinburgh, UK
- **Plenary talk** at 11th International Meeting on Thermodiffusion (IMT11), Bayonne, France, June 2014, as well as IMT12, Madrid, May 2016.
- **MMS13**, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, June 2013
Co-organized a three-session minisymposium on Multiscale Computation of Fluctuating Hydrodynamics and Microscale Mechanics
- **CSE13**, SIAM Conference on Computational Science and Engineering, Boston, MA, February, 2013
Organized a two-session minisymposium on *Hydrodynamics of Complex Fluids at the Micro and Nano-Scales*.
- **Invited presentation** at the workshop on Fluid-Structure Interactions in Soft-Matter Systems, Monash University Prato Center, Italy, November 2012.
- **Physics colloquium** at the Dept. of Physics at Università degli Studi di Milano, Italy, November 2012.
- **Invited presentation**, workshop on Modeling the Dynamics of Complex Molecular Systems, Lorentz Center, Leiden, Netherlands, August 2012.
- **KITP2012**, invited participation in the program on Multiscale Modeling, Analysis and Simulation in Soft Condensed Matter at the KITP institute, UCSB, April 2012.
- **CCP2011**, invited talk at the Conference on Computational Physics, Gatlinburg, Tennessee, October 30th – November 3rd, 2011.

- **Invited talk**, workshop on Multiscale Modeling of Simple and Complex Liquid Flow Using Particle-Continuum Hybrids, ZCAM, Zaragoza, Spain, October 5th-7th, 2011.
- **DSFD2011**, 20th International Conference on Discrete Simulation of Fluid Dynamics, Fargo, August 8-12, 2011
Invited talk on *Numerical Methods for Fluctuating Hydrodynamics*
- **ICIAM2011**, Congress on Industrial and Applied Mathematics, July 18 – 22, 2011, Vancouver, BC, Canada
Organized a minisymposium on *Fluctuating Hydrodynamics: Fluid Mechanics at Small Scales* and
Invited presentation in symposium on *Computational Modeling of Multiscale Systems*.
- **Plenary speaker**, AMS von Neumann Symposium on Multimodel and Multialgorithm Coupling for Multiscale Problems, July 4 - 7, 2011 Snowbird, Utah, USA
A Hybrid Particle-Continuum Method Coupling a Fluctuating Fluid with Suspended Structures
- **Invited talk**, workshop on *Multiscale simulation of heterogeneous materials and coupling of thermodynamic models* at the Thermotechnical Institute at K. U. Leuven, Belgium, from January 12-14th, 2011.
- **MS10**, SIAM Meeting on Mathematical Aspects of Materials Science, Philadelphia, PA, May 23-26, 2010
Organized a two-session minisymposium on *Coarse-Grained Stochastic Models in Soft Condensed Matter*.
- **Invited participation**, workshop on Numerical Analysis of Multiscale Computations, Banff Canada, December 6th-11th, 2009, and Computational Multiscale Methods, Oberwolfach, Germany, June 14th - June 20th, 2009.
- **CSE09**, SIAM Conference on Computational Science and Engineering, Miami, FL, March 2-6, 2009
Organized a three-session minisymposium on *Multiscale Methods for Hydrodynamics at the Micro and Nano-Scales*.

6 Publications

- [1] A. Donev, J. Rockwell, and D. ben Avraham. Generalized von smoluchowski model of reaction rates, with reacting particles and a mobile trap. *J. Stat. Phys.*, 95(1-2):97–112, 1999.
- [2] A. Donev, C. E. Musolf, and P. M. Duxbury. Random manifolds in non-linear resistor networks: applications to varistors and superconductors. *J. Phys. A: Math. Gen.*, 35:L327–L333, 2002.
- [3] S. Torquato, S. Hyun, and A. Donev. Multifunctional optimal composite microstructures: Simultaneous transport of heat and electricity. *Phys. Rev. Lett.*, 89(26):266601, 2002.
- [4] A. Donev and S. Torquato. Energy-Efficient Actuation in Infinite Lattice Structures. *J. Mech. Phys. Solids*, 51(8):1459–1475, 2003.
- [5] S. Torquato, A. Donev, and F. H. Stillinger. Breakdown of Elasticity Theory for Jammed Hard-Particle Packings: Conical Nonlinear Constitutive Theory. *Int. J. Solids Structures*, 40(25):7143 – 7153, 2003.
- [6] S. Torquato, S. Hyun, and A. Donev. Optimal design of manufacturable three-dimensional composites with multifunctional characteristics. *J. Appl. Phys.*, 94(9):5748–5755, 2003.
- [7] A. Donev, I. Cisse, D. Sachs, E. A. Variano, F. H. Stillinger, R. Connelly, S. Torquato, and P. M. Chaikin. Improving the Density of Jammed Disordered Packings using Ellipsoids. *Science*, 303:990–993, 2004.
- [8] A. Donev, F. H. Stillinger, P. M. Chaikin, and S. Torquato. Unusually Dense Crystal Packings of Ellipsoids. *Phys. Rev. Lett.*, 92:255506, 2004.
- [9] A. Donev, S. Torquato, F. H. Stillinger, and R. Connelly. A Linear Programming Algorithm to Test for Jamming in Hard-Sphere Packings. *J. Comp. Phys.*, 197(1):139–166, 2004.
- [10] A. Donev, S. Torquato, F. H. Stillinger, and R. Connelly. Comment on "Jamming at zero temperature and zero applied stress: The epitome of disorder". *Phys. Rev. E*, 70:043301, 2004.
- [11] A. Donev, S. Torquato, F. H. Stillinger, and R. Connelly. Jamming in Hard Sphere and Disk Packings. *J. App. Phys.*, 95(3):989, 2004.
- [12] S. Torquato and A. Donev. Minimal surfaces and multifunctionality. *Proc. Royal Soc. London*, 460(2047):1849 – 1856, 2004.

- [13] A. Donev, S. Torquato, and F. H. Stillinger. Neighbor List Collision-Driven Molecular Dynamics Simulation for Nonspherical Particles: I. Algorithmic Details II. Applications to Ellipses and Ellipsoids. *J. Comp. Phys.*, 202(2):737–764, 765–793, 2005. code available at <http://cims.nyu.edu/~donev/Packing/PackLSD/Instructions.html>.
- [14] A. Donev, S. Torquato, and F. H. Stillinger. Pair Correlation Function Characteristics of Nearly Jammed Disordered and Ordered Hard-Sphere Packings. *Phys. Rev. E*, 71:011105, 2005.
- [15] A. Donev, S. Torquato, and F. H. Stillinger. Unexpected Density Fluctuations in Jammed Disordered Sphere Packings. *Phys. Rev. Lett.*, 95(9):090604, 2005.
- [16] W. Man, A. Donev, F. H. Stillinger, M. Sullivan, William B. Russel, D. Heeger, S. Inati, S. Torquato, and P. M. Chaikin. Experiments on Random Packing of Ellipsoids. *Phys. Rev. Lett.*, 94:198001, 2005.
- [17] S. Torquato, A. Donev, A. G. Evans, and C. J. Brinker. Manufacturable extremal low-dielectric, high-stiffness porous materials. *J. Appl. Phys.*, 97:124103, 2005.
- [18] P. M. Chaikin, A. Donev, W. Man, F. H. Stillinger, and S. Torquato. Some Observations on the Random Packing of Hard Ellipsoids. *Ind. Eng. Chem. Res.*, 45(21):6960–6965, 2006.
- [19] A. Donev, J. Burton, F. H. Stillinger, and S. Torquato. Tetratic Order in the Phase Behavior of a Hard-Rectangle System. *Phys. Rev. B*, 73:054109, 2006.
- [20] A. Donev, F. H. Stillinger, and S. Torquato. Do Binary Hard Disks Exhibit an Ideal Glass Transition? *Phys. Rev. Lett.*, 96(22):225502, 2006.
- [21] M. Skoge, A. Donev, F. H. Stillinger, and S. Torquato. Packing Hyperspheres in High-Dimensional Euclidean Spaces. *Phys. Rev. E*, 74:041127, 2006.
- [22] A. Donev, R. Connelly, F. H. Stillinger, and S. Torquato. Underconstrained Jammed Packings of Hard Ellipsoids. *Phys. Rev. E*, 75:051304, 2007.
- [23] A. Donev, F. H. Stillinger, and S. Torquato. Calculating the Free Energy of Nearly Jammed Hard-Particle Packings Using Molecular Dynamics. *J. Comp. Phys.*, 225:509–527, 2007.
- [24] A. Donev, F. H. Stillinger, and S. Torquato. Configurational Entropy of Binary Hard-Disk Glasses: Nonexistence of an Ideal Glass Transition. *J. Chem. Phys.*, 127:124509, 2007.
- [25] A. Donev. Asynchronous event-driven particle algorithms. *SIMULATION: Transactions of The Society for Modeling and Simulation International*, 85(4):229–242, 2008.
- [26] A. Donev, A. L. Garcia, and B. J. Alder. Stochastic Event-Driven Molecular Dynamics. *J. Comp. Phys.*, 227(4):2644–2665, 2008.
- [27] A. Donev, A. L. Garcia, and B. J. Alder. Stochastic Hard-Sphere Dynamics for Hydrodynamics of Non-Ideal Fluids. *Phys. Rev. Lett.*, 101:075902, 2008.
- [28] A. Donev, A. L. Garcia, and B. J. Alder. A Thermodynamically-Consistent Non-Ideal Stochastic Hard-Sphere Fluid. *J. of Statistical Mechanics: Theory and Experiment*, 2009(11):P11008, 2009.
- [29] T. Oettel, V. V. Bulatov, A. Donev, M. H. Kalos, G. H. Gilmer, and B. Sadigh. First-Passage Kinetic Monte Carlo Method. *Phys. Rev. E*, 80(6):066701, 2009.
- [30] Y. Zhang, A. Donev, T. Weisgraber, B. J. Alder, M. D. Graham, and J. J. de Pablo. Tethered DNA Dynamics in Shear Flow. *J. Chem. Phys.*, 130(23):234902, 2009.
- [31] A. Donev, J. B. Bell, A. L. Garcia, and B. J. Alder. A hybrid particle-continuum method for hydrodynamics of complex fluids. *SIAM J. Multiscale Modeling and Simulation*, 8(3):871–911, 2010.

- [32] A. Donev, V. V. Bulatov, T. Opperstrup, G. H. Gilmer, B. Sadigh, and M. H. Kalos. A First-Passage Kinetic Monte Carlo Algorithm for Complex Diffusion-Reaction Systems. *J. Comp. Phys.*, 229(9):3214–3236, 2010.
- [33] A. Donev, E. Vanden-Eijnden, A. L. Garcia, and J. B. Bell. On the Accuracy of Finite-Volume Schemes for Fluctuating Hydrodynamics. *Communications in Applied Mathematics and Computational Science*, 5(2):149–197, 2010.
- [34] A. Donev, A. L. Garcia, Anton de la Fuente, and J. B. Bell. Diffusive Transport by Thermal Velocity Fluctuations. *Phys. Rev. Lett.*, 106(20):204501, 2011.
- [35] A. Donev, A. L. Garcia, Anton de la Fuente, and J. B. Bell. Enhancement of Diffusive Transport by Nonequilibrium Thermal Fluctuations. *J. of Statistical Mechanics: Theory and Experiment*, 2011:P06014, 2011.
- [36] F. Balboa Usabiaga, J. B. Bell, R. Delgado-Buscalioni, A. Donev, T. G. Fai, B. E. Griffith, and C. S. Peskin. Staggered Schemes for Fluctuating Hydrodynamics. *SIAM J. Multiscale Modeling and Simulation*, 10(4):1369–1408, 2012.
- [37] A. Pal Singh Bhalla, B. E. Griffith, N. A. Patankar, and A. Donev. A Minimally-Resolved Immersed Boundary Model for Reaction-Diffusion Problems. *J. Chem. Phys.*, 139(21):214112, 2013.
- [38] S. Delong, B. E. Griffith, E. Vanden-Eijnden, and A. Donev. Temporal Integrators for Fluctuating Hydrodynamics. *Phys. Rev. E*, 87(3):033302, 2013.
- [39] F. Balboa Usabiaga, X. Xie, R. Delgado-Buscalioni, and A. Donev. The Stokes-Einstein Relation at Moderate Schmidt Number. *J. Chem. Phys.*, 139(21):214113, 2013.
- [40] K. Balakrishnan, A. L. Garcia, A. Donev, and J. B. Bell. Fluctuating hydrodynamics of multispecies nonreactive mixtures. *Phys. Rev. E*, 89:013017, 2014.
- [41] N. Bou-Rabee, A. Donev, and E. Vanden-Eijnden. Metropolis Integration Schemes for Self-Adjoint Diffusions. *SIAM J. Multiscale Modeling and Simulation*, 12(2):781–831, 2014.
- [42] M. Cai, A. J. Nonaka, J. B. Bell, B. E. Griffith, and A. Donev. Efficient Variable-Coefficient Finite-Volume Stokes Solvers. *Comm. in Comp. Phys. (CiCP)*, 16(5):1263–1297, 2014.
- [43] A. Chaudhri, J. B. Bell, A. L. Garcia, and A. Donev. Modeling multiphase flow using fluctuating hydrodynamics. *Phys. Rev. E*, 90:033014, 2014.
- [44] S. Delong, Y. Sun, B. E. Griffith, E. Vanden-Eijnden, and A. Donev. Multiscale temporal integrators for fluctuating hydrodynamics. *Phys. Rev. E*, 90:063312, 2014. Software available at <https://github.com/stochasticHydroTools/MixingIBAMR>.
- [45] S. Delong, F. Balboa Usabiaga, R. Delgado-Buscalioni, B. E. Griffith, and A. Donev. Brownian Dynamics without Green’s Functions. *J. Chem. Phys.*, 140(13):134110, 2014. Software available at <https://github.com/stochasticHydroTools/FIB>.
- [46] A. Donev, T. G. Fai, and E. Vanden-Eijnden. A reversible mesoscopic model of diffusion in liquids: from giant fluctuations to Fick’s law. *Journal of Statistical Mechanics: Theory and Experiment*, 2014(4):P04004, 2014.
- [47] A. Donev, A. J. Nonaka, Y. Sun, T. G. Fai, A. L. Garcia, and J. B. Bell. Low Mach Number Fluctuating Hydrodynamics of Diffusively Mixing Fluids. *Communications in Applied Mathematics and Computational Science*, 9(1):47–105, 2014.
- [48] A. Donev and E. Vanden-Eijnden. Dynamic Density Functional Theory with hydrodynamic interactions and fluctuations. *J. Chem. Phys.*, 140(23):234115, 2014.
- [49] F. Balboa Usabiaga, R. Delgado-Buscalioni, B. E. Griffith, and A. Donev. Inertial Coupling Method for particles in an incompressible fluctuating fluid. *Comput. Methods Appl. Mech. Engrg.*, 269:139–172, 2014. Code available at <https://github.com/fbusabiaga/fluum>.

- [50] A. K. Bhattacharjee, K. Balakrishnan, A. L. Garcia, J. B. Bell, and A. Donev. Fluctuating hydrodynamics of multispecies reactive mixtures. *J. Chem. Phys.*, 142(22):224107, 2015.
- [51] J.A. de la Torre, P. Español, and A. Donev. Finite element discretization of non-linear diffusion equations with thermal fluctuations. *J. Chem. Phys.*, 142(9):094115, 2015.
- [52] S. Delong, F. Balboa Usabiaga, and A. Donev. Brownian dynamics of confined rigid bodies. *J. Chem. Phys.*, 143(14):144107, 2015. Software available at <https://github.com/stochasticHydroTools/RigidMultiblobsWall>.
- [53] A. Donev, A. J. Nonaka, A. K. Bhattacharjee, A. L. Garcia, and J. B. Bell. Low Mach Number Fluctuating Hydrodynamics of Multispecies Liquid Mixtures. *Physics of Fluids*, 27(3):037103, 2015.
- [54] P. Español and A. Donev. Coupling a nano-particle with isothermal fluctuating hydrodynamics: Coarse-graining from microscopic to mesoscopic dynamics. *J. Chem. Phys.*, 143(23), 2015.
- [55] C. Giraudet, H. Bataller, Y. Sun, A. Donev, J. M. Ortiz de Zarate, and F. Crococolo. Slowing-down of non-equilibrium concentration fluctuations in confinement. *EPL (Europhysics Letters)*, 111(6):60013, 2015. Software available at <https://github.com/stochasticHydroTools/MixingIBAMR>.
- [56] A. J. Nonaka, Y. Sun, J. B. Bell, and A. Donev. Low Mach Number Fluctuating Hydrodynamics of Binary Liquid Mixtures. *Communications in Applied Mathematics and Computational Science*, 10(2):163–204, 2015.
- [57] A. Donev R. Cerbino, Y. Sun and A. Vailati. Dynamic scaling for the growth of non-equilibrium fluctuations during thermophoretic diffusion in microgravity. *Scientific Reports*, 5, 2015. Software available at <https://github.com/stochasticHydroTools/MixingIBAMR>.
- [58] P. Baaske, H. Bataller, M. Braibanti, M. Carpineti, R. Cerbino, F. Crococolo, A. Donev, W. Köhler, J. M. Ortiz de Zárate, and Alberto Vailati. The NEUF-DIX Space Project - Non-Equilibrium Fluctuations during Diffusion in complex liquids. *Eur. Phys. J. E*, 39:119, 2016.
- [59] F. Balboa Usabiaga, B. Kallemov, B. Delmotte, A. P. S. Bhalla, B. E. Griffith, and A. Donev. Hydrodynamics of suspensions of passive and active rigid particles: a rigid multiblob approach. *Communications in Applied Mathematics and Computational Science*, 11(2):217–296, 2016. Software available at <https://github.com/stochasticHydroTools/RigidMultiblobsWall>.
- [60] B. Kallemov, A. Pal Singh Bhalla, B. E. Griffith, and A. Donev. An immersed boundary method for rigid bodies. *Communications in Applied Mathematics and Computational Science*, 11(1):79–141, 2016. Software available at <https://github.com/stochasticHydroTools/RigidBodyIB>.
- [61] Jean-Philippe Péraud, Andy Nonaka, Anuj Chaudhri, John B. Bell, Aleksandar Donev, and Alejandro L. Garcia. Low mach number fluctuating hydrodynamics for electrolytes. *Phys. Rev. Fluids*, 1:074103, 2016.
- [62] Y. Bao, A. Donev, B. E. Griffith, D. M. McQueen, and C. S. Peskin. An Immersed Boundary Method with Divergence-Free Velocity Interpolation and Force Spreading. *Journal of Computational Physics*, 347:183–206, 2017.
- [63] Y. Bao, M. Rachh, E. Keaveny, L. Greengard, and A. Donev. A fluctuating boundary integral method for Brownian suspensions. Submitted to *J. Comp. Phys.*, preprint ArXiv:1709.01480, 2017.
- [64] Blaise Delmotte, Aleksandar Donev, Michelle Driscoll, and Paul Chaikin. Minimal model for a hydrodynamic fingering instability in microroller suspensions. *Phys. Rev. Fluids*, 2:114301, 2017.

- [65] Blaise Delmotte, Michelle Driscoll, Paul Chaikin, and Aleksandar Donev. Hydrodynamic shocks in microroller suspensions. *Phys. Rev. Fluids*, 2:092301, 2017.
- [66] Michelle Driscoll, Blaise Delmotte, Mena Youssef, Stefano Sacanna, Aleksandar Donev, and Paul Chaikin. Unstable fronts and motile structures formed by microrollers. *Nature Physics*, 13:375–379, 2017.
- [67] A. M. Fiore, F. Balboa Usabiaga, A. Donev, and J. W. Swan. Rapid sampling of stochastic displacements in brownian dynamics simulations. *J. Chem. Phys.*, 146(12):124116, 2017. Software available at <https://github.com/stochasticHydroTools/PSE>.
- [68] C. Kim, A. J. Nonaka, A. L. Garcia, J. B. Bell, and A. Donev. Stochastic simulation of reaction-diffusion systems: A fluctuating-hydrodynamics approach. *J. Chem. Phys.*, 146(12), 2017. Software available at https://github.com/BoxLib-Codes/FHD_ReactDiff.
- [69] Jean-Philippe Péraud, Andrew J. Nonaka, John B. Bell, Aleksandar Donev, and Alejandro L. Garcia. Fluctuation-enhanced electric conductivity in electrolyte solutions. *Proceedings of the National Academy of Sciences*, 114(41):10829–10833, 2017.
- [70] Brennan Sprinkle, Florencio Balboa Usabiaga, Neelesh A. Patankar, and Aleksandar Donev. Large scale brownian dynamics of confined suspensions of rigid particles. *The Journal of Chemical Physics*, 147(24):244103, 2017. Software available at <https://github.com/stochasticHydroTools/RigidMultiblobsWall>.
- [71] Florencio Balboa Usabiaga, Blaise Delmotte, and Aleksandar Donev. Brownian dynamics of confined suspensions of active microrollers. *J. Chem. Phys.*, 146(13):134104, 2017. Software available at <https://github.com/stochasticHydroTools/RigidMultiblobsWall>.