

CURRICULUM VITAE

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1 Education

Ph.D., Appl. Math., Univ. of British Columbia, Vancouver, Canada, 1995

Ph.D., Physics, USSR Academy of Sciences, Sverdlovsk, USSR, 1990

M.Eng., Engineering Physics, Ural Polytech. Inst., Sverdlovsk, USSR, 1985

2 Positions

2014-present: New York University:

Professor, Courant Institute and Department of Biology.

2002-2014: University of California, Davis:

Professor of Mathematics and Neurobiology.

1999-2002: University of California, Davis:

Associate Professor of Mathematics.

1996-1999: University of California, Davis:

Assistant Professor of Mathematics.

1995-96: University of California, Berkeley:

Research Fellow, Program in Mathematics and Molecular Biology.

1992-95: University of British Columbia, Vancouver, Canada:

Teaching and research assistant, Department of Mathematics.

1990-92: University of Manitoba, Winnipeg, Canada:

Research Associate, Department of Physics.

1985-90: Institute for Metal Physics of the USSR Academy of Sciences:

Researcher, Department of Mathematical and Theoretical Physics.

3 Visiting positions

2010 – 2013: Mechanobiology Institute, National University of Singapore.

2009: National Center for Biological Sciences, Bangalore, India.

2001, 2004: Isaak Newton Institute for Mathematical Sciences, Cambridge.

2000: University of Utah, Department of Mathematics.

4 Awards, fellowships, grants

Current:

US Army Office of Research grant ‘Mathematics of collective cell migration in electric field, PI, 2017-2020.

NIH grant ‘Sizing and Scaling in Functional Muscle Cells, Co-PI, 2017-2022.

ARC (Australian Research Council) grant ‘How motor proteins contract the cell cortex and form a cell division ring, Co-PI, 2017-2022.

BSF (United States- Israel Binational Science Foundation) grant ‘Lamellipodial fragments as a model system for cell motility’, Co-PI, 2010-2019.

5 Awards, honors, fellowships, grants

Past support:

NIH RO1 grant NIGMS GM068952 ‘Mechanics of lamellipodial stability, turning and self-polarization’. PI, 2011-2016.

NIH RO1 grant NIGMS GM068952-01 ‘Dynamics of Mitotic Spindle Morphogenesis’. PI, 2003-2011.

NSF Grants DMS 9707750, 1097749, 0315782, 0715729, 1118206 on mathematical models of cellular movements and mitotic spindle. PI, 1997-2015.

NIH GLUE grant ‘Cell Migration Consortium’. Co-PI, 2001-2011.

DiPrima Lecturer, Rensselaer Polytechnic Institute, 2013.

Chancellor’s Fellowship, University of California, Davis, 2000-2005.

Fellowship in Math and Mol Biol, Univ of California, Berkeley, 1995-96.

Excellence in Teaching Award, University of British Columbia, 1995.

6 Conferences

6.1 Recent invited talks at the conferences

1. Gordon Research Conference on Signaling by Adhesion Receptors (June 3, 2016, Bates College)

Talk: Cell Motility from 2D to 3D.

2. Jacques Monod Conference (8-12 May, 2017, Roscoff, France)

Talk: Multiple nuclei positioning and scaling in muscle cells.

3. The International Workshop on Cell Migration (12-14 June, 2017, Porto Alegre, Brazil)

Talk: Design principles of actin treadmill.

4. 9th IUPAP International Conference on Biological Physics (5-9 June, 2017, Rio de Janeiro, Brazil)

Talk: Cell migration as a free boundary problem.

5. NSF Workshop ‘FINDING YOUR INNER MODELER’(13 July, 2017, Chicago)

Talk: Positioning and size scaling of nuclei in multinucleated muscle cells.

6. Conference ‘Organization and Dynamics of Living Systems’(25-30 September,

- 2017, Corsica)
 Talk: Positioning and size scaling of nuclei in multinucleated muscle cells.
 7. Workshop ‘PDE Models of Motility and Invasion in Active Biosystems’(22-38 October, 2017, Oberwolfach)
 Talk: Cell motility as a free boundary problem. .
 8. Biophysical Society 62nd Annual Meeting (18-22 February, 2018, San Francisco)
 Plenary Talk: Mechanics of Cell Self-Polarization and Turning
 9. American Physical Society March Meeting 2018 (5-9 March, 2018, Los Angeles)
 Invited Talk: Collective Cell Migration in Electric Field.
 10. ‘Mathematics of the Cell: Mechanical and Chemical Signaling across Scales Workshop (12-17 August, 2018, Banff)
 Invited Talk: Scaling and positioning of multiple nuclei in muscle cell.
 11. ‘Inaugural Symposium, NSF-Simons Center for Multiscale Cell Fate Research (1-2 October, 2018, UC Irvine)
 Invited Talk: Scaling and positioning of multiple nuclei in muscle cell.
 12. Conference ‘Mathematics of Living Matter (16-18 October, 2018, Penn State U)
 Invited Talk: Scaling and positioning of multiple nuclei in muscle cell.
 13. Conference ‘Mitotic spindle: From living and synthetic systems to theory (24-27 March, 2019, Split, Croatia)
 Invited Talk: Feedbacks between geometry, mechanics and polarity sorting ensure rapid and precise spindle assembly.
 14. Conference ‘Multiscale modeling in biology (20-22 May, 2019, Minneapolis)
 Invited Talk: Modeling the simplest case of collective cell migration.
 15. Conference ‘Bridging Cellular and Tissue Dynamics from Normal Development to Cancer: Mathematical, Computational, and Experimental Approaches (16-21 June, 2019, Banff)
 Invited Talk: Feedbacks between geometry, mechanics and polarity sorting ensure rapid and precise spindle assembly.

6.2 Recent organized courses, sessions and conferences; series of lectures and mini-courses

1. Organizer of the international meeting “From Motors to Morphogenesis” at Berkeley (May 30-31, 2009).
2. Teacher of the “Applied Mathematics and Modeling” course at Math Dept, National University of Laos (August, 2009)
3. Organizer of the mini-symposium “Cell Migration” at Annual Meeting of the American Society for Cell Biology, Denver (December 7-10, 2011)
4. Lecturer at the summer school ‘Quantitative Physics-Based Multiscale Modeling of Biological Processes’. Porto Alegre, Brazil (July 14-20, 2013)
5. Organizer of the International Workshop ‘Mathematics of the Cell: Integrating Genes, Biochemistry and Mechanics’. Banff, Canada (September 7-12,

2014)

6. Lecturer at the summer schools ‘Modelling Cellular system in Space and Time’. Porquerolles, France (October 5-11, 2014 and October 19-26, 2016)

7. Lecturer at the EMBO practical course ‘Multilevel Modelling of Morphogenesis’. John Innes Centre, Norwich, UK (July 16-24, 2017)

7 Professional activities

- Editorial Board Member: Cell, Molecular Biology of the Cell, Journal of Cell Biology, Current Biology.

- Chair of NIH panel ”Modeling and Analysis of Biological Systems” (2008-2010)

8 Graduate and postgraduate advisees

8.1 Postdoctoral associates

Eric Marland (1998-2000), Diana Verzi (2000-2001), Eric Cytrynbaum (2001-2004), Revathi Ananthakrishnan (2003-2006), Mark Dayel (2006), Ingrid Brust-Mascher (2005-2006, co-advised with Jon Scholey), Boris Rubinstein (2002-2007), Joseph Fass (2005-2007), Assaf Zemel (2006-2008), Patrizia Sommi (2002-2008, co-advised with Jon Scholey), Gul Civelekoglu (2002-2010), Raja Paul (2007-2009), Ambarish Kunwar (2008-2011), Jun Allard (2011-2013), Kripa Gowrishankar (2011-2013), Wanda Strychalski (2009-2013, co-advised with Bob Guy), Jie Zhu (2008-2014), Kun-Chun Lee (2008-2014), Erin Craig (2009-2014), Yao-Hui Sun (2010-2018, co-advised with Min Zhao), Dietmar Oelz (2013-2016), Le Yang (2014-2016, co-advised with Bob Guy), Angelika Manhart (2016-2018), Calina Copos (2017-), Haicen Yue (2018-), Chris Miles (2018-).

8.2 Graduate students

Ms. Nicole London (M.Sc.), Math, UCD, 1999-2001.

Ms. Hanan Souki (M.Sc.), Math, UCD, 2001-2002.

Dr. Barbara Mazzag (Ph.D.), Math, UCD, 1997-2002.

Dr. Angela Gallegos (Ph.D.), Math, UCD, 2002-2005.

Dr. Kami Larripa (Ph.D.), Math, UCD, 2002-2006.

Dr. Dhanya Cheerambathur (Ph.D.), Molecular and Cell Biology, UCD, 2005-2007, co-advised with Jon Scholey.

Dr. Roy Wollman (Ph.D.), Molecular and Cell Biology, UCD, 2003-2008, co-advised with Jon Scholey.

Dr. Stephanie Pullford (Ph.D.), Mechanical and Aeronautical Engineering, UCD, 2009-2013.

Dr. Ben Fogelson (Ph.D.), Math, NYU, 2010-2016.

Ondrej Maxian (Ph.D.), Math, NYU, 2018-, co-advised with C. Peskin and A. Donev.

Selected Publications (out of 140)

- [1] A.Mogilner, L.Edelstein-Keshet, Selecting a common direction. I. How orientational order can arise from simple contact responses between interacting cells, *Journal of Mathematical Biology*, **33**: 619-660 (1995).
- [2] A.Mogilner, L.Edelstein-Keshet, G.B.Ermentrout, Selecting a common direction. II. Peak-like solutions representing total alignment of cell clusters, *Journal of Mathematical Biology*, **34**: 811-842 (1996).
- [3] A.Mogilner, L.Edelstein-Keshet, Spatio-angular order in populations of self-aligning objects: formation of oriented patches, *Physica D*, **89**: 346-367 (1996).
- [4] A. Mogilner, G.Oster, Cell motility driven by actin polymerization, *Biophysical Journal*, **71**: 3030-3045 (1996).
- [5] A. Mogilner, G.Oster, The physics of lamellipodial protrusion, *European Biophysics Journal*, **25**: 47-53 (1996).
- [6] H.-Y. Wang, T. Elston, A. Mogilner, G.Oster, Force generation in RNA Polymerase, *Biophysical Journal*, **74**: 1186-1202 (1998).
- [7] E. Geigant, K. Ladizhansky, A. Mogilner, An integro-differential model for orientational distribution of F-actin in cells, *SIAM Journal of Applied Mathematics*, **59**: 787-809 (1998).
- [8] A. Mogilner, G.Oster, The polymerization ratchet model explains the force-velocity relation for growing microtubules, *European Biophysics Journal*, **28**: 235-242 (1999).
- [9] A.Mogilner, L.Edelstein-Keshet, A non-local model for a swarm, *Journal of Mathematical Biology*, **38**: 534-570 (1999).
- [10] O. Igoshin, A. Mogilner, R. Welch, D. Kaiser, G. Oster, Pattern formation and traveling waves in myxobacteria: Theory and modeling. *Proc. Nat. Acad. Sci. USA*, **98**: 14913-14918 (2001).
- [11] D. Bottino, A. Mogilner, T. Roberts, M. Stewart, G. Oster, How nematode sperm crawl. *J. Cell Science*, **115**: 367-384 (2002).
- [12] A. Mogilner, L. Edelstein-Keshet, Regulation of Actin Dynamics in Rapidly Moving Cells: A Quantitative Analysis. *Biophys. J.*, **83**: 1237-1258 (2002).
- [13] E. Cytrynbaum, J. Scholey, A. Mogilner, A force balance model of early spindle pole separation in Drosophila Embryos. *Biophys. J.*, **84**: 757-769 (2003).
- [14] A. Mogilner, G. Oster, Force generation by actin polymerization II: The elastic ratchet and tethered filaments. *Biophys. J.*, **84**: 1591-1605 (2003).

- [15] J. M. Scholey, I. Brust-Mascher, A. Mogilner, Cell division. *Nature*, **422**: 746-752 (2003).
- [16] A. Mogilner, L. Edelstein-Keshet, L. Bent, A. Spiros, Mutual interactions, potentials, and individual distance in a social aggregation. *J. Math. Biol.*, **47**: 353-389 (2003).
- [17] A. Mogilner, G. Oster, Polymer Motors: Pushing out the Front and Pulling up the Back. *Curr. Biol.*, **13**: R721-R733 (2003).
- [18] A. Mogilner, G. Oster, Shrinking Gels Pull Cells. *Science*, **302**: 1340-1341 (2003).
- [19] E. Cytrynbaum, V. Rodionov, A. Mogilner, Computational model of dynein-dependent self-organization of microtubule asters. *J. Cell Sci.*, **117**: 1381-1397 (2004).
- [20] I. Brust-Mascher, G. Civelekoglu-Scholey, M. Kwon, A. Mogilner and J. M. Scholey, Model for anaphase B: Role of three mitotic motors in a switch from poleward flux to spindle elongation *PNAS*, **101**: 15938-15943 (2004).
- [21] I. L. Novak, B. M. Slepchenko, A. Mogilner, L. M. Loew, Cooperativity between cell contractility and adhesion, *Phys. Rev. Lett.*, **93**: 268109 (2004).
- [22] B. Rubinstein, K. Jacobson, A. Mogilner, Multiscale Two-Dimensional Modeling of a Motile Simple-Shaped Cell. *SIAM J. MMS*, **3**: 413-439 (2005).
- [23] R. Wollman, E. N. Cytrynbaum, J. T. Jones, T. Meyer, J.M. Scholey, A. Mogilner, Efficient chromosome capture requires a bias in the "Search-and-Capture" process during mitotic spindle assembly. *Curr. Biol.*, **15**: 828-832 (2005).
- [24] A. Mogilner and B. Rubinstein, The Physics of Filopodial Protrusion, *Biophys. J.*, **89**: 782-795 (2005).
- [25] E. N. Cytrynbaum, P. Sommi, I. Brust-Mascher, J.M. Scholey, A. Mogilner, Early Spindle Assembly in *Drosophila* Embryos: Role of a Force-balance Involving Cytoskeletal Dynamics and Nuclear Mechanics, *Mol. Biol. Cell*, **16**: 4967-4981 (2005).
- [26] V. Malikov, E. N. Cytrynbaum, A. Kashina, A. Mogilner, V. Rodionov, Centering of a radial microtubule array by translocation along microtubules spontaneously nucleated in the cytoplasm, *Nature Cell Biol.*, **7**: 1213-1218 (2005).
- [27] A. Mogilner, On the Edge: Modeling Protrusion, *Curr. Opin. Cell Biol.*, **18**: 32-39 (2006).

- [28] A. Mogilner, R. Wollman, G. Civelekoglu-Scholey, J. Scholey, Modeling Mitosis, *Trends Cell Biol.*, **16**: 88-96 (2006).
- [29] A. Mogilner, R. Wollman, W. Marshall, Quantitative modeling in cell biology: what is it good for?, *Dev. Cell*, **11**: 279-287 (2006).
- [30] M. Prass, K. Jacobson, A. Mogilner, M. Radmacher, Direct measurement of the lamellipodial protrusive force in migrating cell, *J. Cell Biol.*, **174**: 767-772 (2006).
- [31] C. I. Lacayo, Z. Pincus, M. M. VanDuijn, C. A. Wilson, D. A. Fletcher, F. B. Gertler, A. Mogilner, J. A. Theriot, Emergence of Large-Scale Cell Morphology and Movement from Local Actin Filament Growth Dynamics, *PLOS Biology*, **5**: e233 (2007).
- [32] M. M. Kozlov, A. Mogilner, Model of polarization and bi-stability of cell fragments, *Biophys. J.*, **93**: 1-9 (2007).
- [33] R. Wollman, G. Civelekoglu-Scholey, J. M. Scholey, A. Mogilner, Reverse engineering of force integration during mitosis in the *Drosophila* embryo, *Mol. Syst. Biol.*, **4**: 195 (2008).
- [34] K. Keren, Z. Pincus, G. M. Allen, E. L. Barnhart, G. Marriott, A. Mogilner, J. A. Theriot, Mechanism of shape determination in motile cells, *Nature*, **453**: 475-480 (2008).
- [35] Choi CK, Vicente-Manzanares M, Zareno J, Whitmore LA, Mogilner A, Horwitz AF. Actin and alpha-actinin orchestrate the assembly and maturation of nascent adhesions in a myosin II motor-independent manner. *Nat. Cell Biol.*, **10**: 1039-1050 (2008).
- [36] A. Mogilner, Mathematics of cell motility: have we got its number? *J Math Biol.*, **58**: 105-134 (2009).
- [37] Keren K, Yam PT, Kinkhabwala A, Mogilner A, Theriot J. Intracellular fluid flow in rapidly moving cells, *Nature Cell Biol.*, **11**: 1219-1224 (2009).
- [38] Raja Paul, Roy Wollman, William T. Silkworth, Isaac K. Nardi, Daniela Cimini, Alex Mogilner. Computer simulations predict that chromosome movements and rotations accelerate mitotic spindle assembly without compromising accuracy, *PNAS*, **106**: 15708-1513 (2009).
- [39] Mogilner A., Keren K. The shape of motile cells, *Curr Biol.*, **19**: R762-R771 (2009).
- [40] M J Dayel, O Akin, M Landeryou, V I Risca, A Mogilner, R D Mullins, In Silico Reconstitution of Actin-Based Symmetry Breaking and Motility, *PLoS Biology*, **7**:e1000201 (2009).

- [41] B. Rubinstein, M. F. Fournier, K. Jacobson, A. Verkhovsky, A. Mogilner
Actin-myosin viscoelastic flow in the keratocyte lamellipod, *Biophys. J.*,
97: 1853-1863 (2009).
- [42] A. Mogilner, E. Craig, Toward a quantitative understanding of mitotic-
spindle assembly and mechanics, *J Cell Sci.*, **123**: 3435-3445 (2010).
- [43] J. Zhu, A. Burakov, V. Rodionov, A. Mogilner. Finding the cell center by
a balance of dynein and myosin pulling and microtubule pushing: compu-
tational study. *Mol. Biol. Cell*, **21**: 4418-4427 (2010).
- [44] Barnhart EL, Lee K-C, Keren K, Mogilner A, Theriot JA (2011) An Adhesion-
Dependent Switch between Mechanisms That Determine Motile Cell Shape.
PLoS Biol **9**: e1001059. (2011).
- [45] Valentin Magidson, Christopher B. OConnell, Raja Paul, Jadranka Lonarek,
Alex Mogilner and Alexey Khodjakov Spatial arrangement of chromo-
somes during prometaphase accelerates spindle assembly. *Cell*, **146**: 555-
567 (2011).
- [46] Charles W. Wolgemuth, Jelena Stajic, and Alex Mogilner, Redundant
mechanisms for stable cell locomotion revealed by minimal models. *Bio-
phys J* **101**: 545-553 (2011).
- [47] Ambarish Kunwar, Suvranta K. Tripathy, Jing Xu, Michelle Mattson, Roby
Sigua, Richard McKinney, Clare Yu,3, Alex Mogilner, and Steven P.
Gross, Mechanical stochastic tug-of-war models cannot explain bidirec-
tional lipid-droplet transport. *PNAS*, **108**: 18960-18965 (2011).
- [48] D. Odde, A. Mogilner, Modeling Cellular Processes in 3D. *Trends Cell Biol.*
21: 692-700 (2011).
- [49] Noa Ofer, Alex Mogilner, Kinneret Keren. Actin Disassembly Clock Deter-
mines Shape and Speed of Lamellipodial Fragments. *PNAS*, **108**: 20394-
20399 (2011).
- [50] William T. Silkworth, Isaac K. Nardi, Raja Paul, Alex Mogilner, Daniela
Cimini, Timing of centrosome separation is important for accurate chro-
mosome segregation. *Mol. Biol. Cell* **23**: 401-411 (2012).
- [51] Catherine I. Lacayo, Paula A. G. Soneral, Jie Zhu, Mark A. Tsuchida,
Matthew J. Footer, Frederick S. Soo, Yu Lu, Younan Xia, Alexander
Mogilner, and Julie A. Theriot, Choosing Orientation: Influence of Cargo
Geometry and ActA Polarization on Actin Tails. *Mol. Biol. Cell* **23**:
614-629 (2012)
- [52] Vinogradova T, Paul R, Grimaldi AD, Loncarek J, Miller PM, Yampolsky
D, Magidson V, Khodjakov A, Mogilner A, Kaverina I., Concerted effort of
centrosomal and Golgi-derived microtubules is required for proper Golgi
complex assembly but not maintenance. *Mol. Biol. Cell* **23**: 820-833
(2012).

- [53] Alex Mogilner, Jun Allard and Roy Wollman. Cell polarity: Quantitative modeling as a tool in cell biology. *Science*. **336**: 175-179 (2012).
- [54] Jonathan N. Thon, Hannah Macleod, Antonija Jurak Begonja, Jie Zhu, Kun-Chun Lee, Alex Mogilner, John H. Hartwig, Joseph E. Italiano Jr. Microtubule and cortical forces determine platelet size during vascular platelet production. *Nat. Commun.* **3**: 852 (2012).
- [55] Jie Zhu, Alex Mogilner, Mesoscopic Model of Actin-Based Propulsion. *PLoS Comp Biol*, **8** (11) e1002764 (2012).
- [56] Jun Allard and Alex Mogilner. Traveling waves in actin dynamics and cell motility. *Cur Opin Cell Biol*, **25**: 107-115 (2013).
- [57] Yaohui Sun, Hao Do, Jing Gao, Ren Zhao, Min Zhao, Alex Mogilner. Keratocyte fragments and cells utilize competing pathways to move in opposite directions in an electric field. *Cur Biol*, **23**: 569-574 (2013).
- [58] Greg M. Allen, Alex Mogilner, Julie A. Theriot. Electrophoresis of cellular membrane components creates the directional cue guiding keratocyte galvanotaxis. *Cur Biol*, **23**: 560-568 (2013).
- [59] Weiwei Luo, Cheng-han Yu, Zi Zhao Lieu, Jun Allard, Alex Mogilner, Michael P. Sheetz and Alexander Bershadsky, Analysis of the global organization and dynamics of cytoplasmic actin networks *J Cell Biol*, **202**: 1057-1073 (2013).
- [60] Gaudenz Danuser, Jun Allard and Alex Mogilner. Mathematical modeling of eukaryotic cell migration: insights beyond experiments. *Ann. Rev. Cell Dev. Biol.*, **29**: 501-528 (2013).
- [61] Erin L. Barnhart, Kun-Chun Lee, Greg M. Allen, Julie A. Theriot, Alex Mogilner The balance between cell-substrate adhesion and myosin contraction determines the frequency of motility initiation in fish keratocytes. *PNAS*, **112**: 5045-50 (2015).
- [62] Valentin Magidson, Raja Paul, Nachen Yang, Jeffrey Ault, Christopher O'Connell, Bruce McEwen, Alex Mogilner, and Alexey Khodjakov. Adaptive changes in the kinetochore architecture facilitate proper spindle assembly *Nat Cell Biol*, **17**: 1134-44 (2015).
- [63] Alexis J. Lomakin, Kun-Chun Lee, Sangyoon J. Han, Amy Bui, Michael Davidson, Alex Mogilner, Gaudenz Danuser. Competition of two distinct actin networks for actin defines a bistable switch for cell polarization. *Nat Cell Biol*, **17**:1435-45 (2015).
- [64] Charlotte Guetta-Terrier, Hongyan Long, Pascale Monzo, Jie Zhu, Chew Sing Yian, Alexander Mogilner, Benoit Ladoux, Nils C. Gauthier. Protrusive Waves Guide 3D Cell Migration along Nanofibers. *J Cell Biol*, **211**: 683-701 (2015).

- [65] D. Oelz, B. Rubinstein and A. Mogilner. Contraction of random actomyosin arrays is enabled by the combined effect of actin treadmilling and crosslinking. *Biophys J*, **109**: 1818-29 (2015).
- [65] Zhu J, Mogilner A. Comparison of cell migration mechanical strategies in three-dimensional matrices: a computational study. *Interface Focus*, **6**: 20160040 (2016).
- [66] A. Mogilner and A. Manhart. Agentbased modeling: case study in cleavage furrow models. *Mol Biol Cell*, **27**: 3379-84 (2016).
- [67] Erin L. Barnhart, Jun Allard, Sunny S. Lou, Julie A. Theriot, Alex Mogilner. Adhesion-Dependent Wave Generation in Crawling Cells. *Cur Biol*, **27**: 112 (2017).
- [68] C. A. Copos, S. Walcott, J. C. del Alamo, E. Bastounis, A. Mogilner, R. D. Guy. Mechanosensitive adhesion explains stepping motility in amoeboid cells. *Biophys J*, **112**: 267282 (2017).
- [69] Boujema-Paterski R, Suarez C, Klar T, Zhu J, Gurin C, Mogilner A, Thry M, Blanchoin L. Network heterogeneity regulates steering in actin-based motility. *Nat Comm*, **8**: 655 (2017).
- [70] Boris Y. Rubinstein and Alex Mogilner. Myosin clusters of finite size develop contractile stress in 1D random actin arrays. *Biophys J*, **113**: 937-947 (2017).
- [71] D Raz-Ben Aroush, N Ofer, E Abu-Shah, J Allard, O Krichevsky, A Mogilner, K Keren. Actin turnover in lamellipodial fragments, *Curr Biol*, **27**: 2963-2973 (2017).
- [72] Y Zhang, G Xu, R M Lee, Z Zhu, J Wu, S Liao, G Zhang, Y Sun, A Mogilner, W Losert, T Pan, F Lin, Z Xu, M Zhao. Collective Cell Migration has Distinct Directionality and Speed Dynamics. *Cell Mol Life Sci*, **74**: 3841-3850 (2017).
- [73] M. Nickaen, I.L. Novak, S. Pulford, A. Rumack, J. Brandon, B.M. Slepchenko, A. Mogilner. A free-boundary model of a motile cell explains turning behavior. *PLoS Comp. Biol.*, **13**: e1005862 (2017).
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- [75] A. Mogilner, A. Manhart. Intracellular fluid mechanics: coupling cytoplasmic flow with active cytoskeletal gel. *Annu. Rev. Fluid Mech.*, **50**: 347-370 (2018).

- [76] B. Fogelson, A. Mogilner. Actin-myosin force generation and symmetry breaking in the model stress fiber. *SIAM J. Applied Math.*, **78**: 1754-1777(2018).
- [77] A. Manhart, S. Windner, M. Baylies, A. Mogilner, Mechanical positioning of multiple nuclei in muscle cells. *PLoS Comp. Biol.*, **14(6)**: e1006208 (2018).
- [78] D. B. Oelz, U. del Castillo, V. I. Gelfand, and A. Mogilner, Microtubule dynamics, kinesin-1 sliding and dynein action drive growth of cell processes. *Biophys. J.*, **115**: 1614-1624 (2018).
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- [81] Stefanie E. Windner, Angelika Manhart, Amelia Brown, Alex Mogilner, Mary K. Baylies. Nuclear scaling is coordinated among individual nuclei in multinucleated muscle fibers. *Dev. Cell.*, **49(1)**: 48-62.e3 (2019).
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- [83] Jun Allard, Marie Doumic, Alex Mogilner, Dietmar Oelz. Sliding of two parallel microtubules generated by multiple identical motors. *J. Math. Biol.*, **79**: 571-594 (2019).
- [84] Vikash Verma, Alex Mogilner, Thomas J. Maresca. Classical and Emerging Regulatory Mechanisms of Cytokinesis in Animal Cells. *Biology*, **8(3)**: 55 (2019).
- [85] Greg M. Allen, Kun Chun Lee, Erin L. Barnhart, Mark A. Tsuchida, Cyrus A. Wilson, Edgar Gutierrez, Alexander Groisman, Alex Mogilner, Julie A. Theriot. Cell Mechanics at the Rear Act To Steer the Direction of Cell Migration. bioRxiv 437806; doi: <https://doi.org/10.1101/437806>