Ryan J. Petrie

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EDUCATION AND WORK EXPERIENCE

2015-Present	Department of Biology, Drexel University, Philadelphia, PA.
2008-2015	Research Fellow. Laboratory of Cell and Developmental Biology; Dr. Kenneth M. Yamada, Chief. National Institute of Dental and Craniofacial Research (NIDCR), NIH, Bethesda, MD.
2002-2008	PhD, Anatomy and Cell Biology, Dr. Nathalie Lamarche-Vane, McGill University, Montreal, Quebec, Canada. Thesis: Cellular organization of the netrin receptor DCC and its associated signaling pathways.
1999-2002	MSc, Medical Science, Dr. Julie Deans, University of Calgary, Calgary, Alberta, Canada. Thesis: Membrane dynamics of CD20 and the BCR.
1992-1997	BSc, Biochemistry, University of Victoria, Victoria, British Columbia, Canada.

AWARDS AND SCHOLARSHIPS

2021	Provost's Award for Outstanding Early Career Scholarly Productivity
2019	Antelo Devereaux Award for Young Faculty
2018	Drexel Career Development Award: Philly Motility
2016, 2018	Drexel International Travel Award
2014	NIH-Japan Society for the Promotion of Science Symposium Certificate of Excellence
2012	American Society for Cell Biology Postdoctoral Travel Award
2012	American Society for Matrix Biology Travel Award
2010	Fellows Award for Research Excellence, NIH
2004-2007	Fonds de la recherche en sante Doctoral Research Award
2004	McGill Graduate Studies Fellowship
2003	Cold Spring Harbor Laboratory Tuition Award
2001	American Society for Cell Biology Predoctoral Travel Award
2000-2001	Graduate Research Scholarship
2000	Jacques Loeb Founders Scholarship
2000	Frank R. Lillie Scholarship
2000	Arthritis Chair Scholarship

PUBLICATIONS (*Corresponding or **co-corresponding author)

Cowan, JM, Duggan, JJ, Hewitt, BR, and ***Petrie, RJ**. Non-muscle myosin II and the plasticity of 3D cell migration. 2022. *Frontiers in Cell and Developmental Biology*. 2022 Nov 10;10:1047256.

Marks, PC, Hewitt, BR, Baird, MA, Wiche, G, and ***Petrie, RJ**. Plectin linkages are mechanosensitive and required for the nuclear piston mechanism of 3D cell migration. 2022. *Mol. Biol. Cell.* 10.1091/mbc.E21-08-0414. Online ahead of print.

*__Petrie, RJ__. Visualizing cell motility in mouse ear explants. 2022. *Curr. Protoc.* 2(5):e434. doi: 10.1002/cpz1.434.

Marks, PC and *__Petrie, RJ__. Push or pull: how cytoskeletal crosstalk facilitates nuclear movement through 3D environments. 2022. *Phys. Biol.* 19(2): 10.1088/1478-3975/ac45e3.

Jones, TM, Marks, PC, Cowan, JM, Kainth, DK, and *__Petrie, RJ__. Cytoplasmic pressure maintains epithelial integrity and inhibits cell motility. 2021. *Phys. Biol.* 18(6): 10.1088/1478-3975/ac267a.

Robertson, T, Chengappa, P, Atria, DG, Wu, C, Avery, L, Roy, N, Maillard, I, **Petrie, RJ**, and Burkhardt, J. Lymphocyte Egress Signal Sphingosine-1-Phosphate Promotes ERM-Guided, Bleb- Based Migration. 2021. *J. Cell Biol.* 220(6):e202007182.

Patel, S, McKeon, D, Sao, K, Yang, C, Naranjo, NM, Svitkina, TM, and ***Petrie, RJ**. Myosin II and Arp2/3 crosstalk governs intracellular hydraulic pressure and lamellipodia formation. 2021. *Mol. Biol. Cell* 32:579-589.

Witherel, CE, Sao, K, Brisson, BK, Han, B, Volk, SW, **Petrie, RJ**, Han, L, and Spiller KL. Regulation of extracellular matrix assembly and structure by hybrid M1/M2 macrophages. 2021. *Biomaterials*. 269: 120667.

Lomakin, AJ, Cattin, CJ, Cuveliler, D, Alraies, Z, Molina, M, Nader, GPF, Srivastava, N, Saez, PJ, Garcia-Arcos, JM, Zhitnyak, IY, Bhargava, A, Driscoll, MK, Welf, ES, Fiolka, R, **Petrie, RJ**, De Silva, NS, Gonzalez-Granado, JM, Manel, N, Lennon-Dumenil, AM, Muller, DJ, and Piel, M. The nucleus acts as a ruler tailoring cell responses to spatial constraints. 2020, *Science* 370:eaba2894.

Ishikawa, M, Williams, G, Forcinito, P, Ishikawa, M, **Petrie, RJ**, Saito, K, Fukumoto, S, and Yamada, Y. Pannexin 3 ER Ca2+ channel gating is regulated by phosphorylation at the Serine 68 residue in osteoblast differentiation. 2019. *Sci. Rep.* 9:18759.

Perez-Gonzalez, NA, Rochman, ND, Yao, K, Tao, J, Le, MT, Flanary, S, Sablich, L, Toler, B, Crentsil, E, Takaesu, F, Lambrus, B, Huang, J, Fu, V, Chengappa, P, Jones. TM, Holland, AJ, An, S, Wirtz, D, **Petrie, RJ**, Guan, KL and Sun, SX. YAP and TAZ regulate cell volume. 2019. *J. Cell Biol.* 218:3472-3488.

Chan, CJ, Costanzo, M, Ruiz-Herrero, T, Mönke, G, **Petrie, RJ**, Bergert, M, Diz-Muñoz, A, Mahadevan, L, and Hiiragi, T. 2019. Hydraulic control of mammalian embryo size and cell fate. *Nature* 571:112-116.

Sao, K, Jones, TM, Doyle, AD, Maity, D, Schevzov, G, Chen, Y, Gunning, PW and *__Petrie, RJ__. 2019. Myosin II governs intracellular pressure and traction by distinct tropomyosin-dependent mechanisms. *Mol. Biol. Cell* 30:1170-1181.

Chengappa, P, Sao, K, Jones, TM, and ***Petrie, RJ**. 2017. Intracellular pressure: a driver of cell morphology and movement. *Int. Rev. Cell Mol. Biol.* 337:185-211.

***Petrie, RJ**, Harlin, HM, Korsak, LT, and Yamada, KM. 2017. Activating the nuclear piston mechanism to generate intracellular pressure during tumor cell 3D migration. *J. Cell Biol.* 216: 93-100.

***Petrie, RJ** and Yamada, KM. 2016. Multiple mechanisms of 3D migration: the origins of plasticity. *Curr. Opin. Cell Biol.* 42: 7-12.

****Petrie, RJ** and Yamada, KM. 2015. Fibroblasts lead the way: a unified view of three-dimensional cell motility. *Trends Cell Biol.* 25: 666-674.

Artym, VV, Swatkoski, S, Matsumoto, K, Campbell, CB, **Petrie, RJ**, Li, X, Mueller, SC, Bugge, TH, Gucek, M, and Yamada, KM. 2015. Dense fibrillar collagen is a potent inducer of invadopodia via a specific signaling network. *J. Cell Biol.* 208:331-350.

****Petrie, RJ**, Koo, H, and Yamada, KM. 2014. Generation of compartmentalized pressure by a nuclear piston governs cell motility in a 3D matrix. *Science* 345:1062-1065.

***Petrie, RJ** and Koo, H. 2014. Direct measurement of intracellular pressure. *Curr. Prot. Cell Biol*. 63, 12.9.1.

Gutierrez, N, Eromobor, I, **Petrie, RJ**, Vedula, P, Cruz, L, and Rodriguez, AJ. 2014. Spatially regulated β-actin monomer synthesis promotes epithelial adherens junction assembly. *RNA* 20:689-701.

Doyle, AD, **Petrie, RJ**, Kutys, ML, and Yamada, KM. 2013. Dimensions in cell migration. *Curr. Opin. Cell Biol*. 25:642-649.

****Petrie, RJ** and Yamada, KM. 2012. At the leading edge of 3D cell migration. *J. Cell Sci.* 125:5917-5926.

****Petrie, RJ**, Gavara, N, Chadwick, RS, and Yamada, KM. 2012. Nonpolarized signaling reveals two distinct modes of 3D cell migration. *J. Cell Biol.* 197:439-455.

****Petrie, RJ**, Doyle, AD, and Yamada, KM. 2009. Random versus directionally persistent migration. *Nat. Rev. Mol. Cell Biol.* 10:538-549.

Picard, M, **Petrie, RJ**, Antoine-Bertrand, J, Saint-Cyr-Proulx, E, Villemure, JF, and Lamarche-Vane, N. 2009. Spatial and temporal activation of the small GTPases RhoA and Rac1 by the netrin-1 receptor UNC5a during neurite outgrowth. *Cell. Signal.* 21:1961-1973.

Chevallier, J, Koop, C, Srivastava, A, **Petrie, RJ**, Lamarche-Vane, N., and Presley, JF. 2009. Rab35 regulates neurite outgrowth and cell shape. *FEBS Letters* 583:1096-1101.

Petrie, RJ, Zhao, B, Bedford, F, and Lamarche-Vane, N. 2009. Compartmentalized DCC signalling is distinct from DCC localized to lipid rafts. *Biol. Cell* 101:77-90.

Robert, A, Smadja-Lamere, N, Landry, MC, Champagne, C, **Petrie, R**, Lamarche-Vane, N, Hosoya H, Lavoie JN. 2006. Adenovirus E4orf4 hijacks rho GTPase-dependent actin dynamics to kill cells: a role for endosome-associated actin assembly. *Mol. Biol. Cell* 17:3329-3344.

Li, H, Ayer, LM, Polyak, MJ, Mutch, CM, **Petrie, RJ**, Gauthier, L, Shariat, N, Hendzel, MJ, Shaw, AR, Patel, KD, and Deans, JP. 2004. The CD20 calcium channel is localized to microvilli and constitutively associated with membrane rafts. *J. Biol. Chem.* 279: 19893-19901.

Petrie, RJ and Deans, JP. 2002. Colocalization of the B cell receptor and CD20 followed by activation-dependent dissociation in distinct lipid rafts. *J. Immunol.* 169: 2886-2891.

Petrie, RJ, Schnetkamp, PPM, Patel, KD, Awasthi-Kalia, M, and Deans, JP. 2000. Rapid translocation of the B cell receptor and SHIP to lipid rafts: Evidence towards a role in calcium regulation. *J. Immunol.* 165: 1220-1227.

INVITED PRESENTATIONS (#International)

American Society for Cell Biology Meeting, December, 2022, Washington, DC.

Society of Engineering Science Technical Meeting, October, 2022, College Station, TX.

#Cell Migration Seminars, March 2022, Virtual.

American Society for Cell Biology Meeting, December, 2021, Virtual.

#Cell and Tissue Hydraulics Symposium, National University of Singapore, October 2021, Virtual.

#University of Stuttgart, Cell Biology and Immunology, March, 2021, Stuttgart, Germany, Virtual.

Icahn School of Medicine at Mount Sinai, Microscopy CoRE, January 2021, New York, NY, Virtual.

University of Delaware, Biological Sciences, October 2020, Newark, DE, Virtual.

American Society for Cell Biology Meeting, December, 2019, Washington, DC.

#University of Victoria, Biochemistry and Microbiology, October, 2019, Victoria, Canada.

#University of Saskatchewan, Veterinary Microbiology, October, 2019, Saskatoon, Canada.

Philly Motility, Cell Migration Symposium, May, 2019, Philadelphia, PA.

University of Pennsylvania, Center for Engineering MechanoBiology (CEMB), April, 2019, Philadelphia, PA.

Sidney Kimmel Cancer Center, Breast Cancer Program, March, 2019, Philadelphia, PA.

North Atlantic Microscopy Society Mini-Symposium, February, 2019, Philadelphia, PA.

Johns Hopkins University, Department of Mechanical Engineering, January, 2019, Baltimore, MD.

#12th IEEE International Conference on Nano/Molecular Medicine and Engineering, December, 2018, Honolulu, HI.

TERMIS Guest Symposium, October, 2018, Las Vegas, NV.

#European Molecular Biology Laboratory, September, 2018, Heidelberg, Germany.

#McGill University, Anatomy and Cell Biology, March, 2018, Montreal, Canada.

Rutgers University-Camden, Center for Computational and Integrative Biology, December, 2017, Camden, NJ.

Drexel University, DUCOM, 5th International Symposium on Molecular Medicine & Infectious Disease. November, 2017, Philadelphia, PA.

University of Pennsylvania, Physical Sciences Oncology Center, May, 2017, Philadelphia, PA.

Temple University, Bioengineering, March, 2017, Philadelphia, PA.

Biomedical Engineering Society, October, 2016, Minneapolis, MN.

#The Hunter Cell Biology Meeting, April, 2016, Hunter Valley, Australia.

#University of New South Wales, School of Medical Sciences, April, 2016, Sydney, Australia.

#London Research Institute, Lincoln's Inn Fields Laboratories, February, 2015, London, UK.

#University of New South Wales, School of Medical Sciences, September 2014, Sydney, Australia.

American Society for Matrix Biology Meeting, Special Interest Group Workshop: The Chemistry and Physics of Fibronectin, October 2014, Cleveland, OH.

American Physical Society Meeting, March 2014, Denver, CO. Invitation declined.

Rutgers Newark, Department of Biological Sciences, November 2013, Newark, NJ.

Catholic University of America, Department of Biology, October 2012, Washington, DC.

SYMPOSIUM PRESENTATIONS (#International)

American Society for Matrix Biology Meeting, October 2018, Las Vegas, NV.

#BioMedEng18, September, 2018, Imperial College London, United Kingdom.

American Society for Cell Biology Meeting, December 2014, Philadelphia, PA.

American Society for Matrix Biology Meeting, October 2014, Cleveland, OH.

#ComBio2014, Australian Society for Biochemistry and Molecular Biology Meeting, September 2014, Canberra, Australia.

Signaling by Adhesion Receptors Gordon Conference, June 2014, Lewiston, ME.

UMD-NCI Cancer Technology and Epidemiology Symposium, January 2014, College Park, MD.

American Society for Cell Biology Meeting, December 2013, New Orleans, LA.

FASEB Regulation and Function of Small GTPases Meeting, June 2013, Steamboat Springs, CO.

American Society for Matrix Biology Meeting, October 2010, Charleston, SC.

SERVICE

Ad hoc reviewer 2015-present:	Advanced Science, Agence Nationale de la Reserche (ANR, France), Annual Review of Biophysics, Biophysical Journal, Cell Reports, Cellular Physiology and Biochemistry, Computer Methods in Biomechanics and Biomedical Engineering, Current Biology, Cytoskeleton, eLife, Essays in Biochemistry, European Journal of Cell Biology, Frontiers in Bioinformatics, International Review of Cell and Molecular Biology, iScience, Journal of Biological Chemistry, Journal of Cell Biology, Journal of Cell Science, Molecular Biology of the Cell, Matrix Biology, Molecular Oncology Review, Nano Letters, National Institutes of Health (NIH), Nature Communications, Nature Reviews Rheumatology, Oncogene, PLOS Computational Biology, Seminars in Cell & Dev. Biol., Science Advances, Scientific Reports, Sir Henry Wellcome Fellowships, Trends in Cell Biology
Drexel University	2022-present, Faculty Co-Chair, Drexel Graduate E-Forms Committee 2021-present, Director of the Biology Graduate Program 2021-2022, Drexel Undergraduate Policy Review Committee 2021-2022, Chair of the Tenure-Track Search Committee (2 positions) 2020-2021, CoAS Strategic Plan Steering Committee 2020, Committee on Evaluating the Role of Undergraduate Students in Facilitating Learning 2020, Peer reviewer for Drexel's internal Pew and WW Smith competitions 2019-21, Department of Biology Head Search Committees 2019, Co-Chair Biology Retreat Committee 2018-21, Chair Biology Infrastructure Committee 2018-22, Undergraduate Curriculum Committee 2017-18, Committee on Committees 2016-20 and 2022-23, Biology Seminar Series Organizer 2016-17, Co-Chair Strategic Planning Committee 2015-18, 2020-21, Graduate Committee
American Society for Matrix Biology	2022-present, ASMB Council Member 2020-present, ASMB Communication and Outreach Committee 2020-present, Co-Chair of ASMB E-Symposium Series 2018-present, ASMB Membership Committee
American Society for Cell Biology	2019-22, Co-Chair of a Special Interest Subgroup at the ASCB Annual Meeting 2018-present, ASCB Membership Committee 2017-18, ASCB Scientific Tracks Taskforce for the Annual Meeting 2016-20, ASCB Scientific Program Taskforce for the Annual Meeting

Philly Motility	2018-19, Co-Organizer of this meeting to highlight the Philadelphia cell migration research community
National Institutes of Health	2022, Ad hoc Reviewer for National Cancer Institute R13 conference grants 2017, NIH Early Career Reviewer for the Intercellular Interactions study section 2016, Member of an Academic Career Panel on the NIH campus

TEACHING AND MENTORING

2016-Present	Graduate Students: Matt Cowan (PhD) Breanne Hewitt (PhD) Jacob Duggan (PhD) Pragati Chengappa (PhD, 2021) Tia Jones (PhD, 2021)	BIO497 and Undergraduate Volunteers: Alessa Alex, Praneetha Bheemarasetty, Nikita Dahake, Samir Jambhekar, Matey Juric, Devneet Kainth, Donna Kwon, Harleigh McNally, Nicole Naranjo, Shivani Patel, Kimheak Sao, Aysha Siddiquee, and Jia Yuan.	Undergraduate STAR Scholars: Blaise Leonchuck, Jade-Lyn Gray, Shivani Patel, Nicholas Sookhoo, Jordyn Caldwell, Brittany Hood, McKayla Procopio, and Rahul Chowdhury

2019-Present	Instructor for BIO211 Cell, Molecular and Developmental Biology II (~140 students)
2017-Present	Instructor for BIO433/632 Advanced Cell Biology (~15 students)
2015-16	Co-Instructor for BIO430/630 Cell Biology of Disease and BIO433/632 Advanced Cell Biology
2018-22	Guest Instructor for CAMB703/BE640, The ECM, Adhesion Receptor Signaling, and Translational Biomechanics (University of Pennsylvania)
2017	Guest Instructor for the RUN IMAGE program (Rutgers University – Newark) designed to introduce local high school students to cell biology and microscopy
2012-2015	Instructor for Introductory Biochemistry (BIOC 301/302) for the Foundation for Advanced Education in the Sciences Graduate School
2011-2015	Mentored five trainees, NIDCR Summer Internship Program