Guillermina Ramírez-San Juan, Ph.D.

Education

2011–2017 **Ph.D. Biophysical Sciences**, *The University of Chicago*, Chicago, Illinois USA.
Dissertation: "Cell migration: A multi-scale integration problem"

2006–2011 **B.S. Physics**, *Universidad Nacional Autónoma de México*, Mexico city, Mexico.
Thesis: "Effects of electrical polarization on the opening rate constant of a voltage-gated ion channel"

Research Experience

2020–present **Assistant Professor of Physics and Biology**, *Brandeis University*.
My lab combines approaches from fluid mechanics, active matter, cell and developmental biology, to study how cilia integrate their activity and generate macroscopic fluid flows.

2017–2020 **Postdoctoral Scholar**, *University of California San Francisco – Stanford University*, Supervisors: Wallace Marshall and Manu Prakash.
My research focused in understanding how spatial patterning of an array of cilia controls the topology of the flow generated by it. To address this question I used a combination of *ex-vivo* tissue imaging, biophysical measurements and computational modeling.

2011–2017 **Graduate Student**, *The University of Chicago*,
Supervisor: Margaret Gardel.
My research focused on understanding how cells integrate cues from each other and the environment to undergo directed migration. To address this question I used a combination of cell biological tools and biophysical measurements.

Summer 2015 **MBL Physiology course**, *Marine Biological Laboratory*.
During this research course I was challenged every two weeks with a new research project in a different field. I worked on problems that ranged from understanding scaling of cell and organelle size to establishment of cell polarity.

2009–2011 **Undergraduate Researcher**, *Universidad Nacional Autónoma de México*,
Supervisor: Leon lslas Suarez.
My research focused in understanding the structure and gating kinetics of potassium ion channels. To address this question I used a combination of electrophysiology measurements and mathematical modeling.

Teaching Experience

Spring 2021 **Instructor**, *Brandeis University*.
Quantitative Biology Instrumentation Laboratory

2010–2016 **Teaching assistant**, *The University of Chicago*.
- Quantitative Analysis of Biological Dynamics
- Extracellular Matrices: Chemistry and Biology

2009–2011 **Teaching assistant**, *Universidad Nacional Autonoma de Mexico*.
- Electromagnetic Theory
- Contemporary Physics
- Statistical Mechanics

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Honors and Awards

2019 **UCSF-IRACDA Postdoctoral Fellowship**, *National Institute of Health.*

2019 **Minority Affairs Committee Travel Award**, *American Society for Cell Biology.* Received to attend the society's annual meeting in Washington, DC, USA .

2018 **Minority Affairs Committee Travel Award**, *American Society for Cell Biology.* Received to attend the society's annual meeting in San Diego, CA, USA .

2017 **Minority Affairs Committee Travel Award**, *American Society for Cell Biology.* Received to attend the society's annual meeting in Philadelphia, PA, USA .

2015 **MBL Physiology course scholarship**, *Marine Biological Laboratory.*

2012 **NSF Graduate Research Fellowship (GRFP)**, *National Science Foundation.*

2011 **Rackham Merit Fellowship**, *University of Michigan*, Declined.

2011 **Carlson Fellowship**, *Department of Biophysics, Johns Hopkins University*, Declined.

2009 **UNAM-University of California Education Abroad Program**, *University of California Berkeley.*

Publications

Ramírez-San Juan G.R., Mathijssen A.J.T.M., He M., Jan L., Marshall W., and Prakash M. (2020) Multi-scale spatial heterogeneity enhances particle clearance in airway ciliary arrays. *Nature Physics*, 16(9):958–964.

Oakes P.W., Bidone T.C., Beckham Y., Skeeters A.V., **Ramírez-San Juan G.R.**, Winter S.P., Voth G.A., and Gardel M.L. (2018) Lamellipodium is a myosin-independent mechanosensor. *Proceedings of the National Academy of Sciences*, 115(11):2646–2651.

Fessenden T.B., Beckham Y., Perez-Neut M., **Ramírez-San Juan G.R.**, Chourasia A.H., MacCleod K.F., Oakes P.W., and Gardel M.L. (2018) Dia1-dependent adhesions are required by epithelial tissues to initiate invasion. *The Journal of Cell Biology*, 217(4):1–18.

Ramírez-San Juan G.R., Oakes P.W., and Gardel M.L. (2017) Contact guidance requires spatial control of leading-edge protrusion. *Molecular Biology of the Cell*, 28(8):1043–1053. PMID: 28228548.

Hissa B., Oakes P.W., Pontes B., **Ramírez-San Juan G.R.**, and Gardel M.L. (2017) Cholesterol depletion impairs contractile machinery in neonatal rat cardiomyocytes. *Scientific Reports*, 7:43764.

Cetera* M., **Ramírez-San Juan* G.R.**, Oakes P.W., Lewellyn L., Fairchild M.J., Tanentzapf G., Gardel M.L., and Horne-Badovinac S. (2014) Epithelial rotation promotes the global alignment of contractile actin bundles during *Drosophila* egg chamber elongation. *Nature Communications*, 5:5511 (*co–first author).

Ramírez-San Juan G.R., Minzoni A.A., and Islas L.D. (2013) Effects of electrical polarization on the opening rate constant of a voltage-gated ion channel. *Phys. Rev. E*, 88:012720.

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Invited Talks

Jun 2021 **FASEB SRC The Biology of Cilia and Flagella**.

Jun 2021 **University of Colorado School of Medicine Department seminar**.

Mar 2021 **American Physical Society March meeting**.

Mar 2021 **Columbia University Biology Department seminar**.

Dec 2020 **Tufts University Molecular and Developmental Biology seminar**.

Oct 2020 **Biological Physics/Physical Biology Virtual seminar**.

Aug 2020 **Society for Developmental Biology Annual meeting**.

Feb 2018 **UC Berkeley Molecular and Cell Biology Department seminar**.

Feb 2018 **University of Chicago Physics Department seminar**.

Feb 2018 **UC Berkeley Physics Department seminar**.

Feb 2018 **Brandeis University Biology Department seminar**.

Feb 2018 **Harvard Quantitative Biology Initiative seminar**.

Apr 2017 **NSF Center for cellular construction quarterly meeting**.

Mar 2017 **NSF Center for systems and synthetic biology monthly seminar**.

Dec 2016 **Stanford University BioEngineering Department**.

Dec 2016 **UC San Francisco Biophysics and Biochemistry Department**.

Dec 2013 **American Society for Cell Biology Annual meeting**.

Presentations

2020 **EMBL Symposium: Microtubules: From Atoms to Complex Systems**.
"Multi-scale spatial heterogeneity enhances particle clearance in airway ciliary arrays"

2019 **Annual Meeting of the American Society for Cell Biology**.
"Multi-scale spatial heterogeneity in the airway multiciliated epithelium underlies directed flow generation".

2019 **American Physical Society Division of Fluid Dynamics meeting**.
"Multi-scale spatial heterogeneity enhances particle clearance in airway ciliary arrays"

2019 **American Physical Society March meeting**.
"Spatial heterogeneity of cilia contributes to directed flow generation"

2018 **Annual Meeting of the American Society for Cell Biology**.
"Efficient mucus clearance requires multi-scale integration of ciliary spatial organization and kinematics"

2018 **Santa Cruz Developmental Biology meeting**.
"Biophysical interactions between cilia and mucus underlie directed fluid transport in the ventral epithelium of the planarian *S. mediterranea*"

2018 **EMBL Symposium: Tissue Self-Organization: Challenging the systems**.
"Biophysical interactions between cilia and mucus underlie directed fluid transport in the ventral epithelium of the planarian *S. mediterranea*"

2017 **Annual Meeting of the American Society for Cell Biology**.
"Biophysical interactions between cilia and mucus underlie directed fluid transport in the ventral epithelium of the planarian *S. mediterranea*"

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2016 **Annual Meeting of the American Society for Cell Biology**.
"Contact guidance requires spatial control of leading-edge protrusion".

2015 **Annual Meeting of the American Society for Cell Biology**.
"ECM geometry promotes directed cell migration by β-pix mediated polarization of leading edge protrusions"

2014 **Annual Meeting of the American Society for Cell Biology**.
"ECM Geometry Promotes Directed Cell Migration by Regulating Leading Edge Dynamics"

2013 **Annual Meeting of the American Society for Cell Biology**.
"ECM Topography Regulates Collective Cell Migration and Cytoskeletal Polarization"

2012 **Annual Meeting of the American Society for Cell Biology**.
"Individual platelet contraction dynamics stimulated via two distinct signaling pathways"

Service Activities

Service to the community

2019 **Presenter at Bay Area Maker Faire**, Led an interactive activity designed to communicate my research to the general public.

2018 **Presenter at the exploratorium Latino Engineering day**, Presented my research in an interactive format in Spanish and English at the science museum in San Francisco.

2014–2016 **Team leader with the Science and Technology Outreach Mentorship Program**, Gave weekly science lessons to elementary school students at a charter school in Chicago.

2015 **Organizer of the first "Art of Science" show**, `http://chicagoartsdistrict.org/event_detail.asp?eventid=1485`, Coordinated with the Chicago art district to organize an open gallery night where graduate students presented their research.

2015 **Organizer of the Communication in Science Workshop for Graduate Students (ComSciCon) Chicago**, `http://comscicon.com/comscicon-chicago-2015`, Organized a two day workshop on science communication for graduate students.

Service to the university

2020–present **Brandeis University, Biology department seminar organizer**.

2015–2016 **University of Chicago, Founder and organizer of Pizza Science and Discussion (P|S|D)**, P|S|D is a series of talks by graduate students in the Physical Sciences Division aimed to promote collaborations across departments.

2014–2015 **University of Chicago, Biophysical Sciences student representative in the Physical Sciences Division student dean's advisory council**.

2013–2015 **University of Chicago, Member of the Biophysics Student Advisory Board (BSAB)**, BSAB is responsible for interfacing students with the program faculty and mentoring incoming graduate students.

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