HORACIO FRYDMAN

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EDUCATION

Ph.D. 2002	Cell and Developmental Biology	Johns Hopkins University, Baltimore MD
M.Sc. 1992	Molecular Biology	University of São Paulo, Brazil

ACADEMIC APPOINTMENTS

2016 – Present	Investigator National Emerging Infectious Disease Lab, Boston University, Boston, MA
2015 - Present	Associate Professor Department of Biology, Boston University, Boston, MA
2007- 2015	Assistant Professor Department of Biology, Boston University, Boston, MA
2008- 2012	Associate Director Vector Transmitted Infectious Diseases Core (NEIDL), Boston University, Boston, MA
2009	Visiting Professor IMC University of Applied Sciences Krems, Austria

TRAINING

1991	Visiting Scholar, Lab of Dr. Marcelo Jacobs-Lorena Case Western Reserve University, Cleveland, OH
2002	Ph.D. Student with Dr. Allan Spradling Carnegie Institute of Washington and Dept. of Biology Johns Hopkins University, Baltimore, MD
2002 – 2006	Howard Hughes Medical Institute Research Associate, Lab of Dr. Eric Wieschaus (Nobel Prize, 1995) Princeton University, Princeton, NJ
2006 – 2007	Princeton University Research Scholar Lab of Dr. Eric Wieschaus

Princeton, NJ

AWARDS AND HONORS

1991	International Training Award – CNPQ (Conselho Nacional de Pesquisa) National Research Council, Brazilian Government
1993	E.I. du Pont De Nemours Company award for excellence in teaching Cell Biology Johns Hopkins University, Baltimore, MD
1994	E.I. du Pont De Nemours Company award for excellence in teaching Dev. Biology Johns Hopkins University, Baltimore, MD (Voted best TA by the Johns Hopkins "Oraculum", undergraduate newspaper)
2004	Best Post Doctoral Fellow Talk Princeton University, Department of Molecular Biology Retreat
2006	Chair of the opening session of the 4th International *Wolbachia* Conference. San Juan, Puerto Rico
2008	Chair of the Cell Biology session of the 5th International *Wolbachia* Conference, 2008 Crete, Greece
2009	Visiting Professor IMC University of Applied Sciences, Krems, Austria, April 2009.
2010	Chair of the Cell Biology session of the 6th International Wolbachia Conference Asilomar, CA (also: two awards for Frydman's lab students at this meeting: Best Talk and Best Poster, details below)
2013	Co-chair of the Immunity and Pathogenesis session of the 54th Annual Drosophila Research Conference, Washington DC
2014	Chair of the Microbiome Session II at the "Arthropod Vectors and Disease Transmission: Translational Aspects" workshop at the NIH – NIAID, Rockville, MD
2014	Chair of the Cell Biology Symposium at the 8th International Wolbachia Conference, Innsbruck, Austria
2017	Faculty Member at the F1000
2018	Co-Chair of the Cell Biology Symposium at the 10th International Wolbachia Conference, Salem, MA

GRANT SUPPORT

1R56AI097589-01A1 (Horacio Frydman, PI)
NIH – NIAID
Manipulation of stem cell activity and cell death by intracellular bacteria

Proposal No: 1225360 (Horacio Frydman, PI)
NSF – IOS - SYMBIOSIS DEF & SELF RECOG, 5/2013 – 04/2016
Mechanisms of Wolbachia stem cell niche tropism

Training grants

NSF training grant (PI Thomas D Gilmore)
03/2009 – 02/2015
REU Site: Expanding Minority Research Opportunities in Cross-Disciplinary Biology
Role: participating faculty

Beckman (PI Thomas D Gilmore)
Arnold & Mabel Beckman Foundation, 06/01/2014 - 08/31/2017
2014 Beckman Scholars Program
Role: participating faculty

PREVIOUS GRANT SUPPORT

K22 AI074909 (Horacio Frydman, PI)
NIH/NIAID
Host-pathogen interactions in targeting Wolbachia to the stem cell niche

3UC7AI070088-05S1 Sub # 7213 (Horacio Frydman, PI)
NIH/NIAID
Vector Transmitted infectious Disease Core

INVITED ACADEMIC AND RESEARCH INSTITUTION SEMINARS (listing only from 2007, since joined Boston University**)**

2017	Penn State University, Department of Entomology, University Park, PA
2015	Harvard School of Public Health, Dep. of Immunology and Infectious Diseases, Boston MA
2015	Indiana University, Dept. of Biology, Bloomington, IN
2015	Harvard University, Dept. of Molecular and Cellular Biology, Cambridge MA
2014	Johns Hopkins University, Department of Biochemistry & Molecular Biology, Baltimore MD
2013	NIH-NICHD (National Institute of Child and Human Diseases), Section on Gamete Development, Bethesda MD
2013	Institute for Genome Sciences, University of Maryland, Baltimore, MD
2012	University of Massachusetts Medical School, Division of Infectious Diseases and Immunology Worcester MA
2012	Northeastern University, Department of Biology, Boston MA
2012	BioMixer, Department of Biology, Boston University, Boston MA
2009	Uniformed Services University of the Health Sciences, Department of Biochemistry and Molecular Biology, Bethesda, MA
2009	University of Oxford, Department of Zoology, Oxford, UK
2009	University of Rochester, Department of Biology, Rochester, NY
2008	Institute Jacques Monod, Paris, France
2008	Haverford College, Harverford, PA (Keynote Speaker for a Haverford and Bryn Mawr colleges Annual Research Symposium)
2008	University of North Carolina at Charlotte, Department of Biology, Charlotte, NC
2008	Boston University School of Medicine, Stem Cell Seminar Series, Boston University Regenerative Medicine Initiative (BURMI), Boston MA
2008	BioMixer, Department of Biology, Boston University, Boston MA
2008	New England BioLabs, Division of Parasitology, Ipswich, MA

CONFERENCE ORAL PRESENTATIONS (invited or selected from submitted abstract; listing only from 2007, since joined Boston University)

2018	ESA, ESC, and ESBC Joint Annual Meeting. Vancouver, British Columbia, Canada.
2018	10th International Wolbachia Conference, Salen, MA
2014	8th International Wolbachia Conference, Innsbruck, Austria
2013	MIT, First Symposium of Brazilian Academic Community in New England, Boston MA
2013	NIH-NIAID, Vector Biology Workshop, Bethesda MD
2012	Cold Spring Harbor Germ Cells Meeting, Cold Spring Harbor Laboratory, Long Island, NY
2012	COST (European Cooperation in Science and Technology) Arthropod Symbiosis Meeting, St Pierre d'Oléron, France
2012	7th International *Wolbachia* conference, St Pierre d'Oléron, France
2012	Keystone Symposia The Life of a Stem Cell: From Birth to Death, Olympic Valley, CA
2011	Eastern PA Branch of American Society of Microbiology, Philadelphia, PA, December (Keynote Speaker)
2010	6th International Wolbachia Conference, Asilomar, CA.
2009	7th International Life Science Meeting. IMC University of Applied Sciences Krems, Austria (Keynote Speaker)
2008	5th Wolbachia International Meeting, Crete, Greece
2008	Symposium "Lung Regeneration: Concepts, Model Systems and Strategies" Boston University School of Medicine, Boston MA
2007	ICIRD 2007 (International Congress on Invertebrate Reproduction and Development) Smithsonian Research Station, Panama City, Panama

INVITED WORKSHOPS

2014 NIH-NIAID (National Institute of Allergy and Infectious Diseases), Bridging vector and allied arthropod biology for innovation and discovery, Bethesda MD

2013 NIH-NIAID (National Institute of Allergy and Infectious Diseases), Effect of Vector Innate Immunity and Human-Derived Immune Molecules on the Transmission of Vector-Borne Pathogens, Bethesda MD

PUBLICATIONS IN PEER REVIEWED JOURNALS

Lefoulon, E.; Vaisman, N.; Frydman, H. M.; Sun, L.; Foster, J. M.; Slatko, B. E. (2019). "Large Enriched Fragment Targeted Sequencing (LEFT-SEQ) Applied to Capture of *Wolbachia* Genomes". Nature Scientific Reports 9, Article Number 5939

Kamath, A. D., Deehan, M. A., and **Frydman, H. M.** (2018). "Polar cell fate stimulates Wolbachia intracellular growth." Development 145(6).

Schultz, M. J., Connor, J. H. and **Frydman, H. M.** (2018). "Group B Wolbachia Strain-Dependent Inhibition of Arboviruses." DNA Cell Biol **37**(1): 2-6.

Schultz, M. J., Tan, A. L., Gray, C. N., Isern, S., Michael, S. F., **Frydman, H. M.** and Connor, J. H. (2018). "Wolbachia wStri Blocks Zika Virus Growth at Two Independent Stages of Viral Replication." MBio **9**(3).

Schultz, M. J., Isern, S., Michael, S. F., Corley, R. B., Connor, J. and **Frydman, H. M.** (2017). "Variable inhibition of Zika virus replication by different Wolbachia strains in mosquito cell cultures." J Virol **91**(14): e00339-00317.

Schultz, M. J., Tan, A. L., Gray, C. N., Isern, S., Michael, S. F., Frydman, H. M., & Connor, J. H. (2018). Wolbachia wStri Blocks Zika Virus Growth at Two Independent Stages of Viral Replication. MBIO, 9(3)

Simhadri, R. K., Fast, E. M., Guo, R., Schultz, M. J., Vaisman, N., Ortiz, L., Bybee, J., Slatko, B. E. and **Frydman, H. M.** (2017). "The Gut Commensal Microbiome of Drosophila melanogaster Is Modified by the Endosymbiont Wolbachia." mSphere **2**(5).

Toomey M., **Frydman H.M.** (2014) Extreme divergence of *Wolbachia* tropism for the stem-cell-niche in the *Drosophila* testis. **PLoS Pathogens,** December 18, 2014, 10(12): e1004577. doi:10.1371/journal.ppat.1004577

Toomey M., Panaram K., Fast E., Beatty C., **Frydman H.M.** (2013) Evolutionarily conserved *Wolbachia*-encoded factors control patterns of stem-cell-niche tropism in *Drosophila* ovaries and favor infection. **PNAS** June 25, 2013 vol. 110 no. 26 10788-10793

Fast, E., Toomey, M., Panaram,K., Desjardins, D., **Frydman H.M.** (2011) *Wolbachia* enhance *Drosophila* stem cell proliferation and target the germline stem cell niche. ***Science*** 18 November 2011: Vol. 334 no. 6058 pp. 990-992.

- selected by the Faculty of 1000, which placed this work at the top 2% of published articles in biology and medicine.
- covered by the popular press on both national and international levels, including USA Today, The Scientist, BioTechniques, Le Nouvel Observateur (French journal), the Australian Broadcasting Corporation, Russian International News Agency, and Spectrum (German news service) and Galileo (Italian science news journal)

Beaucher, M., Goodlife, J., Hersperger, E., Trunova S., **Frydman, H.M**., Shearn, A. (2007) *Drosophila* brain tumor metastases express both neuronal and glial cell type markers. ***Developmental Biology*** 301 (1), 287-297

Frydman, H.M. *Wolbachia* infection in *Drosophila* (2007) ***JoVE*** (Journal of Visualized Experiments). Issue 2: March 1st, 2007. http://www.jove.com

Frydman, H.M., Li, J.M., Robson, D., Wieschaus, E. (2006) Somatic Stem Cell Niche tropism in *Wolbachia*. ***Nature*** 441 (May 25th), 509-12.

- highlighted in Nature, "Authors -Making the paper" section: http://www.nature.com/nature/journal/v441/n7092/pdf/7092xviia.pdf

Frydman, H.M. Isolation of live bacteria from adult insects (2006) ***Nature Protocols***, doi 10.1038/nprot.2006.131
http://www.natureprotocols.com/2006/06/23/isolation_of_live_bacteria_fro.php

Ferre*, P.M., **Frydman, H.M.***, Li, J.M., Cao, J., Wieschaus, E., Sullivan, W (2005). *Wolbachia* Utilizes Host Microtubules and Dynein for Anterior Localization in the *Drosophila* Oocyte. ***PLoS Pathogens*** 1(2): 111-124 (e14)

***** these authors contributed equally to this work

- *Nature*, Research Highlights (Cell Biology: From Mother with Love) v437 (27 October 2005). http://www.nature.com/nature/journal/v437/n7063/full/4371210a.html

Frydman, H.M. and Spradling, A.C. (2001). The receptor-like tyrosine phosphatase *Lar* is required for epithelial planar polarity and for axis determination within *Drosophila* ovarian follicles. ***Development*** 128, Number 16:3209-20.

Frydman, H.M., Cadavid EO, Yokosawa J, Silva FH, Navarro-Cattapan LD, Santelli RV, Jacobs-Lorena M, Graessmann M, Graessman. (1993). Molecular characterization of the DNA puff C-8 gene of Rhynchosciara americana. ***Journal of Molecular Biology*** 233(4): 799-803.

Soares, G., **Prydman, H.M**., Cattapan, L.D.N. and Santelli, R.V. (1989) Studies on the unit of transcription of C8 DNA puff. ***Braz. arch. biol. technol***. v.32(1): 64

Pirrota, V., Bonaldo, M.F., Amabis, J.M., Santelli, R.V., **Frydman, H.M.**, Cattapan, L.D.N. & Lara, F.J.S. (1988) Cloning of sequences from B2 DNA puff of *Rhynchosciara* salivary gland chromosomes. ***Braz. arch. biol. technol***. v.31(1): 41

INVITED REVIEW ARTICLES AND BOOK CHAPTERS

Frydman, HM. "Location location location: *Wolbachia* targeting of tissues during host development". In preparation, to be published in 2015 in the "Annual Review of Cell and Developmental Biology"

Frydman, HM "Quantification of intracellular bacteria in host cells". In preparation, to be published in "Methods in Molecular Biology: Drosophila oogenesis".

PROFESSIONAL ACTIVITIES

Grant Reviewer for NWO (Netherlands Organization for Scientific Research), Council for Earth and Life Sciences

Grant Reviewer for the following areas of NSF:
-Animal Development and Evo-Devo
-Symbiosis, Defense and Self Recognition

Grant Reviewer for the Human Frontier Science Program, France

Grant Reviewer for the Natural Sciences and Engineering Research Council of Canada (NSERC)

EDITORIAL ACTIVITIES

Manuscript reviews: Nature Reviews Microbiology, PNAS, Development, Journal of Cell Biology, PLoS Biology, PLoS Pathogens, PLoS Genetics, PLoS Neglected Tropical Diseases, Molecular Biology of the Cell, PLoS One, FEMS Microbiology Ecology, Journal of Exp. Zool. Part B: Mol. and Dev. Evolution, Applied and Environmental Microbiology, Genetics and Molecular Biology

TEACHING

Course load at Boston University with grant release is one course per year (3.5-5 hrs/week for 13 weeks)

2008 Guest Lecturer, Principles of Biology, Honors Program (BI 107HP)
Guest Lecturer, Cellular Aspects of Development and Differentiation (CAS BI 410)

2009 Developed independently a new course: *Biology of Stem Cells* (BI 551)

2010 Sole instructor, *Biology of Stem Cells* (BI 551)

Guest Lecturer, CAS BI 410 Cellular Aspects of Development and Differentiation

2011 Sole instructor, *Biology of Stem Cells* (BI 551)

2012 Sole instructor, *Biology of Stem Cells* (BI 551)

2012 Developed a new course: *Symbiosis and Microbiome* (BI 581)

Guest Lecturer, Epigenomics (BE 550)

2013 Sole instructor, *Biology of Stem Cells* (BI 551)
Obs.: due to high demand, the student limit was increased and this course was taught Fall and Spring of 2013

2014 Sole instructor, *Biology of Stem Cells* (BI 551)

2015 Sole instructor, *Symbiosis and Microbiome* (BI 411 / 611) (This is an updated version from the previous 581 Microbiome class, this class changed from two to four credits)

PREVIOUS AND CURRENT LAB MEMBERS

Prof. Maria Cristina Carlan da Silva (Sabbatical Professor from Universidade Federal do ABC, Brazil, previous)
Dr. Kanchana Panaram (Post-doc, previous)
Dr. Parthena Sanxiridis (Post-doc, previous)
Dr. Eva Fast (PhD student, previous)
Michelle Toomey (PhD student, previous)

Rama Krishna Simhadri (PhD student, current)
Ajit Kamath (PhD student, current)
Mark Deehan (PhD student, current)
Gabriel Gaisböck (Visiting MA student from University of Applied Sciences, Krems, Austria, previous)
Kathryn Kosteva (Undergrad, current)
Catherine Beatty (Undergrad, previous)
Danielle Desjardins (Undergrad, previous)
Barrett Steinberg (Undergrad, previous)
Bowie Matteson (Undergrad, previous)
Bala Krishna Vemula (Undergrad, previous)
Luca Russo (Undergrad, previous)
Megan Feddern (Undergrad, previous)

STUDENT HONORS AND AWARDS

Graduate students
Eva Fast: Former PhD student

- 1st Place, Best Oral Presentation, 6th International *Wolbachia* Conference, Asilomar, CA 2010
- NSF student travel award, 6th International *Wolbachia* Conference, Asilomar, CA 2010
- George Bernard travel Award for Keystone Stem Cell Meeting, 2012
- Guest lecturer at IMC University of Applied Sciences Krems, Austria, 2012
- Cover story of annual alumni magazine of IMC University of Applied Sciences Krems, Austria, 2012
- Travel grant by IMC University of Applied Sciences Krems, 2012
- ASciNA (Austrian scientists and scholars in Northern America) Award by the Austrian Minister for Science and Research. The price is endowed with 20 000 Euro (26 500$) and is being awarded for outstanding publications of the last 12 months. Austria, 2012
- Belamarich Award for the outstanding doctoral dissertation in biology, Boston MA 2014
- Speaker for the Graduate School Hooding Ceremony, Boston MA 2014

Michelle Toomey: 6th year graduate student

- 1st Place, Best Poster Award, 6th International *Wolbachia* Conference, Asilomar CA, June 2010
- 2nd Place, Best Talk, Biology Department Graduate Student Symposium, Boston University, May 2012
- 1st Place, Best Oral Presentation, 7th International *Wolbachia* Conference, Oleron France, June 2012
- 1st Place, Best Talk, Biology Department Graduate Student Symposium, Boston University, May 2013
- Terner Award for outstanding contribution to Molecular and Cell Biology and Biochemistry at Boston University (Summer stipend support), May 2013
- 2nd Place, Best Oral Presentation, 8th International *Wolbachia* Conference, Innsbruck Austria, June 2014

Rama Krishna Simhadri: 4th year graduate student

- Boston University Presidential Award 2010 (this was an award given to outstanding applicants to Graduate School, if funded stipend for the student for one full year)
- 3rd Place, Best Oral Presentation, 8th International *Wolbachia* Conference, Innsbruck Austria, June 2014

Ajit Kamath: 3rd year graduate student

- George Bernard Travel Award for Drosophila Research Conference 2013

Undergraduate students

- Barrett Steinberg (2008-2010, Honors for Undergraduate Research Thesis, Tau Beta Pi Engineering Honor Society, currently PhD student at Johns Hopkins University, Dept. of Biomedical Engineering.
- Catherine Beatty (2009-2010), Outstanding Undergraduate Research Thesis, currently MD student at UT Southwestern.