

# PAVEL A. BRODSKIY

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## EDUCATION

### University of Notre Dame, Notre Dame, IN

Ph.D.: Chemical Engineering

present

Thesis: Calcium as a signal integrator in *Drosophila* wing imaginal disc development

### University of Notre Dame, Notre Dame, IN

M.S.: Chemical Engineering

2016

Thesis: Calcium signaling during epithelial wound-healing

### Iowa State University, Ames, IA

B.S.: Chemical Engineering, Biology

2013

Honors thesis: Effect of extracellular matrix molecules and genetic modification of mesenchymal stem cells with neurotrophic factor genes on proliferation, migration and factor secretion

## PUBLICATIONS

**Brodskiy PA**, Zartman JJ. Calcium as a signal integrator in developing epithelial tissues.

*Physical Biology*, accepted **2018 April 3**. In press. doi: [10.1088/1478-3975/aabb18](https://doi.org/10.1088/1478-3975/aabb18).

Nematbakhsh A†, Sun W†, **Brodskiy PA**†, Amiri A†, Narciso C, Xu Z, Zartman JJ, Alber MS.

Multi-scale computational study of the mechanical regulation of cell mitotic rounding in epithelia. *PLOS Computational Biology*, **2017 May 22**. doi: [10.1101/037820](https://doi.org/10.1101/037820).

Narciso C, Cowdrick KR, Zellmer VR, Brito-Robinson T, **Brodskiy PA**, Hoelzle DJ, Zhang S, Zartman JJ. On-chip three-dimensional tissue histology for microbiopsies. *Biomicrofluidics*, **2016 Mar 1**. doi: [10.1063/1.4941708](https://doi.org/10.1063/1.4941708).

Kursawe J, **Brodskiy PA**, Zartman JJ, Baker RE, Fletcher AG. Capabilities and limitations of tissue size control through passive mechanical forces. *PLOS Computational Biology*, **2015 Dec 29**. doi: [10.1371/journal.pcbi.1004679](https://doi.org/10.1371/journal.pcbi.1004679).

Arena JT, Manickam SS, Reimund KK, **Brodskiy PA**, McCutcheon JR. Character and performance relationships for a high water flux commercial thin film composite membrane in forward osmosis desalination and pressure retarded osmosis. *Industrial & Engineering Chemistry Research*, **2015 Sep 17**. doi: [10.1021/acs.iecr.5b02309](https://doi.org/10.1021/acs.iecr.5b02309).

Narciso C, Wu Q, **Brodskiy PA**, Garston G, Baker RE, Fletcher AG, Zartman JJ. Patterning of wound-induced intercellular calcium flashes in a developing epithelium. *Physical Biology*, **2015 Sep 2**. doi: [10.1088/1478-3975/12/5/056005](https://doi.org/10.1088/1478-3975/12/5/056005).

Sharma AD, **Brodskiy PA**, Petersen EM, Dagdeviren M, Ye EA, Mallapragada SK, Sakaguchi DS. High throughput characterization of adult stem cells engineered for delivery of therapeutic factors for neuroprotective strategies. *Journal of Visualized Experiments*, **2015 Jan 4**. doi: [10.3791/52242](https://doi.org/10.3791/52242).

Solin SL, Wang Y, Mauldin J, Schultz LE, Lincow DE, **Brodskiy PA**, Jones CA, Syrkin-Nikolau J, Linn JM, Essner JJ, Hostetter J, Whitley EM, Cameron JD, Chou HH, Severin AJ, Sakaguchi DS, McGrail M. Molecular and cellular characterization of a zebrafish optic pathway tumor line implicates glia-derived progenitors in tumorigenesis. *PLOS ONE*, **2014 Dec 8**. doi: [10.1371/journal.pone.0114888](https://doi.org/10.1371/journal.pone.0114888).

†These authors contributed equally to the work.

## PEER-REVIEWED CONFERENCE PAPERS

Liang P†, Chen J†, **Brodskiy PA**, Wu Q, Zhang Y, Zhang Y, Yang L, Zartman JJ, Chen DZ. A new registration approach for dynamic analysis of calcium signals. *IEEE International Symposium on Biomedical Imaging*. **2018 April 4-7**, Washington DC, USA. Preprint: [arXiv:1802.00491](https://arxiv.org/abs/1802.00491).

†These authors contributed equally to the work.

**MANUSCRIPTS IN PREPARATION**

Wu Q†, **Brodskiy PA†**, Huizar FJ, Jangula JJ, Narciso C, Levis M, Brito-Robinson T, Zartman JJ. In vivo relevance of intercellular calcium signaling in Drosophila wing development. In preparation. Preprint doi: [10.1101/187401](https://doi.org/10.1101/187401).

**Brodskiy PA†**, Wu Q†, Huizar FJ, Soundarajan DK, Narciso C, Levis M, Arredondo-Walsh N, Chen J, Liang P, Chen DZ, Zartman JJ. Intercellular calcium signaling is regulated by morphogens during Drosophila wing development. In preparation. Preprint doi: [10.1101/104745](https://doi.org/10.1101/104745).

**Brodskiy PA†**, Eberts PM†, Narciso C, Kursawe J, Fletcher A, Zartman JJ. QuickStitch for seamless stitching of confocal mosaics through high-pass filtering and recursive normalization. In preparation. Preprint doi: [10.1101/075440](https://doi.org/10.1101/075440).

Wu Q†, **Brodskiy PA†**, Snyder KL, Huizar FJ, Tautges SJ, Penuela-Tamayo M, Gone CM, Velagala VKN, Snyder M, Zartman JJ. A quantitative mapping of the calcium signaling phenome during Drosophila wing morphogenesis. In preparation.

†These authors contributed equally to the work.

**HONORS AND AWARDS****Grants and Fellowships**

Recipient	Walther Cancer Foundation IITP Fellowship	2016 to 2018
Recipient	University Honors Award	2013
Recipient	Stewart Research Grant	2013
Recipient	Honors Mentor Program Grant	2012
Recipient	National Merit Scholar®	2009 to 2013

**Honors**

Champion (Team)	Novo Nordisk Innovation in Action Global Case Competition	2016
Champion (Team)	Novo Nordisk Innovation in Action US Case Competition	2016
Recipient	Cleanest Workspace	2016
Honorable Mention	NSF Graduate Research Fellowship Program (GRFP)	2015
Member	Cardinal Key Honor Society	2013
Representative	Research in the Capitol (Iowa Legislature)	2011
Finalist	DoE Science and Energy Research Challenge	Fall 2010
Member	Tau Beta Pi engineering honor society	Fall 2010
Member	ISU Honors Program	2009 to 2013

**Travel awards**

Recipient	Downes Memorial Fund Award	2016
Recipient	Zahm Research Travel Grant	2016
Recipient	GSU Conference Presentation Grant (CPG)	2016
Recipient	Notebaert Professional Development Award	2015

**PROFESSIONAL DEVELOPMENT****q-bio Colorado State University Summer School Program**

Colorado State University; Fort Collins, CO June 5-22, 2017  
Talk: Calcium signaling in multi-scale, high content screens.

**CCL Workshop on Scalable Scientific Computing 2016**

Cooperative Computing Lab; Notre Dame, IN October 19-20, 2016  
Talk: Combining Fast and Slow Features for High-Content Drug Characterization

**SDSC Summer Institute 2016: High Performance Computing for the Long Tail of Science**

San Diego Supercomputer Center; San Diego, CA August 1-5, 2016

**Research & Statistical Tools Camp**

Centers for: Digital Scholarship, Social Research; Notre Dame, IN

May 11, 2016

**Workshop: Design Principles for Engineering Biology**

NSF; Tysons Corner, VA

November 11-12, 2015

**Software Carpentry Workshop**

Center for Research Computing; Notre Dame, IN

November 6-7, 2015

**SELECT PRESENTATIONS**

**Proffered oral presentations**

Spatiotemporal analysis of Ca<sup>2+</sup> signaling. 5th Midwest Quantitative Biology Symposium, Notre Dame, IN. April 8, 2017.

Spatiotemporal regulation of calcium signaling by morphogens in a developing epithelium. American Institute of Chemical Engineers (AIChE) Annual Meeting. San Francisco, CA. November 13, 2016.

High-content drug characterization through integration of slow and fast Ca<sup>2+</sup> phenomena. 4th Midwest Quantitative Biology Symposium, Purdue, IN. October 22, 2016.

Quantitative analysis of EGFR-regulated size control in the *Drosophila* epidermis. 2014 Midwest *Drosophila* Conference. Allerton, IL. November 1-2, 2014.

**Proffered poster presentations**

Hedgehog signaling modulates intercellular calcium waves through an incoherent feed-forward loop in the wing disc. 58th Annual *Drosophila* Research Conference. San Diego, CA. March 29-April 2, 2017.

Computational analysis of spatiotemporally-patterned intercellular Ca<sup>2+</sup> transients in the *Drosophila* wing imaginal disc. The Allied Genetics Conference. Orlando, FL. July 13-17, 2016.

Quantitative analysis of EGFR-regulated size control in the *Drosophila* epidermis. 56th Annual *Drosophila* Research Conference. Chicago, IL. March 4-8, 2015. 308A.

Computational analysis of patterned intercellular calcium transients in the *Drosophila* wing disc. 2015 Midwest *Drosophila* Conference. Allerton, IL. October 24-25, 2015.

**Intramural oral presentations**

Combining Fast and Slow Features for High-Content Drug Characterization. Cooperative Computing Lab, Notre Dame, IN. October 19, 2016.

Morphogenetic regulation of Ca<sup>2+</sup> signaling in a developing epithelium. Stem Cell Colloquium. Center for Stem Cells and Regenerative Medicine, Notre Dame, IN. July 13, 2016.

Modification of Oasys™ forward osmosis membrane. The Innovation Connection. University of Connecticut, Storrs, CT. July 26, 2012.

Analysis of cell proliferation and differentiation in a zebrafish model for retinoblastoma. Symposium on Undergraduate Research and Creative Expression. Iowa State University, Ames, IA. April 17, 2012.

Characterization of a novel model to study human retinoblastoma. Symposium on Undergraduate Research and Creative Expression. Iowa State University, Ames, IA. April 19, 2011.

**Intramural poster presentations**

The mechanical regulation of mitotic rounding in epithelia. Harper Cancer Research Institute Sixth Annual Research Day, Notre Dame, IN. April 10, 2017.

Canonical Hedgehog signaling spatially patterns intercellular  $Ca^{2+}$  waves in a developing epithelium. Harper Cancer Research Institute Sixth Annual Research Day, Notre Dame, IN. April 10, 2017.

Morphogens regulate spatiotemporal-patterning of  $Ca^{2+}$  in a developing epithelium. Second CBEGSO Graduate Research Symposium. Department of Chemical and Biomolecular Engineering, Notre Dame, IN. September 7, 2016.

Quantitative analysis of EGFR-regulated size control in the *Drosophila* epidermis. Harper Cancer Research Day. Harper Cancer Research Institute, Notre Dame, IN. April 13, 2015.

Quantitative analysis of EGFR-regulated size control in the *Drosophila* epidermis. Graduate Student Union and Office for Postdoctoral Scholars Seventh Annual Research Symposium. University of Notre Dame, Notre Dame, IN. April 9, 2015.

Quantitative analysis of EGFR-regulated size control in the *Drosophila* epidermis. First CBEGSO Graduate Research Symposium. Department of Chemical and Biomolecular Engineering, Notre Dame, IN. March 9, 2015.

Characterization of cellular differentiation in a zebrafish model for retinoblastoma. Iowa State University Summer Undergraduate Research Symposium. Iowa State University, Ames, IA. August 5, 2011.

Characterization of a novel model to study human retinoblastoma. Research in the Capitol. Des Moines, IA. March 22, 2011.

Immunohistochemical analysis of a zebrafish model of retinoblastoma. Science and Energy Research Challenge. Argonne National Laboratory. Lemont, IL. November 14, 2010.

Immunohistochemical analysis of a zebrafish model of retinoblastoma. Iowa State University Summer Undergraduate Research Symposium. Iowa State University, Ames, IA. August 6, 2010.

## ACTIVITIES

### Educational Outreach and Leadership

Judge	Northern Indiana Science & Engineering Fair	2015 to 2018
Volunteer	Design for Change	2016
Judge	State Science and Technology Fair of Iowa	2011 to 2013
Head organizer	Engineering merit badge	2013
Co-organizer	Nuclear Engineering merit badge	2012
Judge	Ames Lab Science Bowl	2010 to 2012

### Administrative Leadership Positions

Treasurer	Tau Beta Pi	2012 to 2013
Committee Member	University Honors Grants Committee	2011 to 2012
Assistant Initiation Officer	Tau Beta Pi	2011 to 2012

### Other Activities

Competitor (round 2)	ModelOff competition	2015
Competitor	Iowa State Cyber Defense Competition	2007 to 2010