

# Heath E. Johnson

## EDUCATION

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2008-2015     **North Carolina State University**     Raleigh, NC  
2015     Ph.D., Chemical Engineering  
Dissertation: *Cytoskeletal and Signaling Dynamics Underlying Directional Persistence of Cell Migration*

2010     M.S., Chemical Engineering

2003-2008     **The University of Tennessee**     Knoxville, TN  
2008     B.S., Chemical Engineering  
Minor: Chemistry

## RESEARCH EXPERIENCE

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2022 -     **The University of Hong Kong**     Hong Kong, Hong Kong  
Assistant Professor, School of Biological Sciences

2015-Present     **Princeton University**     Princeton, NJ  
NRSA Postdoctoral Fellow, Department of Molecular Biology  
Sponsor: Prof. Jared Toettcher and Stas Shvartsman

2008-2015     **North Carolina State University**     Raleigh, NC  
Research Assistant, Department of Chemical and Biomolecular Engineering  
Advisor: Prof. Jason Haugh

2007-2008     **The University of Tennessee**     Knoxville, TN  
Research Assistant, Department of Chemical Engineering  
Advisor: Prof. Bamin Khomami

## TEACHING/SERVICE

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2017     EMBO Practical Course: Optogenetics and Cell Signaling (trainer)

2012     Teaching Assistant, ChE 551: Biochemical Engineering

2011     Graduate Recruiting Captain

2009     Teaching Assistant, ChE 205: Chemical Process Principles

2009     Teaching Assistant, ChE 225: Intro to Chemical Engineering Analysis

2006     AIChE Student Chapter Vice President

2006     Engineer's Day Coordinator

## AWARDS

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2018	Drosophila Image Award - Honorable mention
2017	Art of Science (WSJ Feature)
2016-2019	Ruth Kirschstein National Research Service Fellow
2008	Provost's Fellowship

## PUBLICATIONS

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### Peer-Reviewed Research Articles:

1. Colonna MM, Goyal Y, **Johnson HE**, Syal S, Schedl P, and Deshpande G. Preformation and epigenesis converge to specify primordial germ cell fate in the early Drosophila embryo., (in review)
2. **Johnson HE**, Djabrayan, NJV, Shvartsman SY, and Toettcher JE. Optogenetic rescue of a patterning mutant., *Current Biology*, 30, 1-11 (2020)
3. **Johnson HE** and Toettcher JE. Signaling dynamics control cell fate in the early Drosophila embryo. *Developmental Cell*, 48 (3), 361-370. (2019)
4. Asokan, SB, **Johnson HE**, Sondek JD, Shutova MS, Svitkina TM, Haugh JM, Bear JE. Lysophosphatidic acid provokes fibroblast chemotaxis through combinatorial regulation of myosin II. *BioRxiv* (in revision)
5. Winer BY, Shirvani-Dastgerdi E, Bram Y, Sellau J, Low BE, **Johnson HE**, Huang T, Hrebikova G, Heller B, Sharon Y, Giersch K, Gerges S, Pais MA, Frankel AS, Chiriboga L, Cullen J, Lutgehetmann M, Toettcher J, Wiles MV, Schwartz RE, Ploss A. Preclinical assessment of antiviral combination therapy in a genetically humanized mouse model for persistent hepatitis delta virus infection. *Science Trans. Med.* 10 (447) (2018)
6. **Johnson HE**, Goyal Y, Pannucci N, Schüpbach T, Shvartsman SY, and Toettcher JE. The spatiotemporal limits of developmental Erk signaling. *Developmental Cell*, 40 (2), 185-192. (2017) [Journal Cover; Best of 2017]
7. **Johnson HE**, and Haugh JM. Are filopodia privileged signaling structures in migrating cells? *Biophysical Journal*, 111 (9), 1827-1830. (2016)
8. King SJ, Asokan SB, Haynes EM, Zimmerman SP, Rotty JD, Alb. Jr. JG, Tagliatela A, Blake D, Lebedeva IP, Marston D, **Johnson HE**, Parsons M, Sharpless NE, Kuhlman B, Haugh JM, and Bear JE. Lamellipodia are critical for haptotactic sensing and response. *Journal of Cell Science*, 129(12):2329-42. (2016)
9. Haynes EM, Asokan SB, King SJ, **Johnson HE**, Haugh JM, and Bear JE. GMF $\beta$  controls branched actin content and lamellipodial retraction in fibroblasts. *Journal of Cell Biology*, 209, 803-812 (2015).
10. **Johnson HE**, King SJ, Asokan SB, Rotty JD, Bear JE, and Haugh JM. F-actin bundles direct the initiation and orientation of lamellipodia through adhesion-based signaling. *Journal of Cell Biology*, 208, 443-455. (2015).

11. Rotty JD, Wu C, Haynes EM, Winkelman JD, Suarez C, **Johnson HE**, Haugh JM, Kovar DR, and Bear JE. Arp2/3-dependent and independent actin assembly pathways are compartmentalized by profilin. *Developmental Cell*, 32, 54–67 (2015).
12. Asokan, SB, **Johnson, HE**, Rahman, A, King, SJ, Rotty, JD, Lebedeva, IP, Haugh, JM, and Bear, JE. Mesenchymal Chemotaxis Requires Selective Inactivation of Myosin II at the Leading Edge via a Noncanonical PLC $\gamma$ /PKC $\alpha$  Pathway. *Developmental Cell*, 31, 747–760 (2014).
13. Welf ES, **Johnson HE**, and Haugh JM. Bidirectional coupling between integrin-mediated signaling and actomyosin mechanics explains matrix-dependent intermittency of leading-edge motility. *Molecular Biology of the Cell*, 24:3945–55 (2013).
14. Welf ES, Ahmed S, **Johnson HE**, Melvin AT, Haugh JM. Migrating fibroblasts reorient directionality by a metastable, PI3K-dependent mechanism. *Journal of Cell Biology*, 197(1):105-14 (2012).

Review Articles, Methods Articles and Book Chapters:

1. **Johnson HE** Application of optogenetics to probe the signaling dynamics of cell fate decision making. (in review)
2. **Johnson HE**, and Toettcher JE. Illuminating developmental biology with cellular optogenetics. *Current Opinion in Biotechnology*. 52:42–48 (2018)
3. **Johnson HE** and Toettcher JE. The Duty of an Intracellular Signal: Illuminating Calcium’s Role in Transcriptional Control. *Cell Systems*, 2(4):223-224. (2016)
4. **Johnson HE** and Haugh JM. Quantitative Analysis of Phosphoinositide 3-Kinase (PI3K) Signaling Using Live-Cell Total Internal Reflection Fluorescence (TIRF) Microscopy. *Current Protocols in Cell Biology*, 61:14.14.1-14.14.24 (2013).

**INVITED TALKS**

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Molecular Biology Society of Japan Annual Meeting, Fukuoka, Japan	December 2019
RIKEN Center for Biosystems Dynamics Research, Kobe, Japan	December 2019
Kyoto University, Kyoto, Japan	December 2019
National Institute for Basic Biology, Okazaki, Japan	December 2019
University of Tokyo, Tokyo, Japan	December 2019
American Society for Cell Biology Annual Meeting, San Diego, CA	December 2018
Santa Cruz Developmental Biology Meeting, Santa Cruz, CA	August 2018
Tsinghua University, Beijing, China	June 2018
Annual Drosophila Research Conference, Philadelphia, PA	April 2018
American Society for Cell Biology Annual Meeting, Philadelphia, PA	December 2017
Gordon Conference on Developmental Biology, South Hadley MA	May 2017
Agency for Science, Technology and Research, Singapore	May 2017
American Society for Cell Biology Annual Meeting, San Francisco, CA	December 2016
Triangle Cytoskeleton Meeting, Durham, NC	September 2014