Curriculum Vitae

BING HE, Ph.D.

Assistant Professor, Department of Biological Sciences
Molecular and Cellular Biology Graduate Program
Cancer SiGNs Program, Norris Cotton Cancer Center
Dartmouth College, 78 College Street
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Education

B.Sc.	Biology, Peking University, 2001
Ph.D.	Biology, University of Pennsylvania, 2008

Research and Professional Experience

2016-Present	Assistant Professor of Biological Sciences Molecular and Cellular Biology Graduate Program Dartmouth College, Hanover, NH
2009-2015	Laboratory of Eric Wieschaus, Princeton University Postdoctoral research on the mechanics of tissue folding, mechanism of cellularization, and organization of heterochromatin
2002-2008	Laboratory of Wei Guo, University of Pennsylvania Ph.D. thesis research on the function of the exocyst in polarized exocytosis and actin dynamics
2000-2001	Laboratory of Yi Li, Peking University Undergraduate thesis research on RNA-mediated virus resistance in tobacco plants

Fellowships and Awards

2018-2023	NIH Maximizing Investigators' Research Award for Early Stage Investigators
2006	American Society for Cell Biology Travel Awards
2000	Guang Hua Scholarship, Peking University
1999, 2000	Honor for Outstanding Academic Performances, Peking University
1999	The May Fourth Scholarship, Peking University

Professional Service

Manuscript Reviewer: *Nature Cell Biology*, *Nature Physics*, *Nature Communications*, *Developmental Cell*, *Development, Developmental Biology*, *Cell Reports*, *PLoS Genetics*, *Current Biology*, *Journal of Cell Biology*, *Scientific Reports*, *Nature Reviews Molecular Cell Biology*, *Small GTPases*, *Genetics, Seminars in Cell and Developmental Biology*, *Bio-protocol*

Professional Society Membership:

- American Society for Cell Biology
- Genetics Society of America
- Society for Developmental Biology

Current Grant Support

- **NIH Maximizing Investigators' Research Award for Early Stage Investigators (R35) 1R35GM128745**
  Bing He (PI), Zi Chen (Senior associate, The Thayer School of Engineering)
  "*Regulation and function of region-specific tissue mechanical properties in epithelial folding*"
  07/20/2018 – 06/30/2023 $1,250,000 ($55,000 to Thayer)
- **NIH Maximizing Investigators' Research Award for Early Stage Investigators (R35) Administrative Supplement Request**
  Bing He (PI).
  07/01/2019 – 06/30/2020 $125,000.

Previous Grant Support

- **American Cancer Society Institutional Research Grant 2018 (Norris Cotton Cancer Center):** Bing He (PI)
  "*Regulation of cell mechanics by apical-basal polarity determinants*"
  5/1/2018 - 4/30/2019 $30,000
- **American Cancer Society Institutional Research Grant 2016 (Norris Cotton Cancer Center):** Bing He (PI)
  "*Mechanisms of cell surface expansion underlying morphological transformation of tissue*"
  6/1/2016 - 5/31/2017 $30,000
- **NJ Commission on Cancer Research Fellowship:** Bing He (Post-Doctoral Fellow)
  "*In vivo analysis of Drosophila ventral furrow formation*"
  12/01/2009 - 11/30/2012 $86,000

Other Grant Support (Shared Instrumentation Grant)

- NIH S10 Instrumentation Programs: Yasmath Ahmed (PI), Bing He (Major User & Technical Expertise)
  "*Super-resolution spinning disk confocal microscope for Dartmouth Life Sciences*"
  2022 $600,000

Publications

1. Hanqing Guo, Shicheng Huang, Bing He. (2022) Evidence for a role of the lateral ectoderm in Drosophila mesoderm invagination. *Front. Cell Dev. Biol.*. doi: 10.3389/fcell.2022.867438.
2. Wei Chen, Bing He. (2022) Actomyosin activity-dependent apical targeting of Rab11 vesicles reinforces apical constriction. *J Cell Biol*. 221(6). doi: 10.1083/jcb.202103069.
3. Hanqing Guo, Michael Swan, Bing He. (2022) Optogenetic inhibition of actomyosin reveals mechanical bistability of the mesoderm epithelium during Drosophila mesoderm invagination. *Elife* 11:e69082. doi: 10.7554/eLife.69082.
4. Melisa Fuentes, Bing He. (2022) The cell polarity determinant Dlg1 facilitates epithelial invagination by promoting tissue-scale mechanical coordination. *Development*. 149(6):dev200468. doi: 10.1242/dev.200468.
5. Samuel Reed*, Wei Chen*, Victoria Bergstein, Bing He. (2022) Toll-Dorsal signaling regulates the spatiotemporal dynamics of yolk granule tubulation during *Drosophila* cleavage. *Dev Biol.* 481:64-74. doi: 10.1016/j.ydbio.2021.09.009. * These authors contributed equally.
6. Bing He*, Adam Martin, Eric Wieschaus. (2016) Flow-dependent myosin recruitment during *Drosophila* cellularization requires zygotic *dunk* activity. *Development* 143(13):2417-30. * Corresponding author.
7. Bing He, Konstantin Doubrovinski, Oleg Polyakov, Eric Wieschaus (2014) Apical constriction drives tissue-scale hydrodynamic flow to mediate cell elongation. *Nature* 508(7496):392-6.
8. Oleg Polyakov, Bing He, Michael Swan, Joshua Shaevitz, Matthias Kaschube, Eric Wieschaus (2014). Passive mechanical forces control cell shape change during *Drosophila* ventral furrow formation. *Biophysical Journal* 107(4):998-1010.
9. Bing He, Amy Caudy, Lance Parsons, Adam Rosebrock, Attilio Pane, Sandeep Raj, Eric Wieschaus (2012) Mapping the pericentric heterochromatin by comparative genomic hybridization analysis and chromosome deletions in *Drosophila melanogaster*. *Genome Research* 22(12):2507-19.
10. Michael Gelbart, Bing He, Adam Martin, Stephan Thiberge, Eric Wieschaus, Matthias Kaschube (2012) Volume conservation principle involved in cell lengthening and nucleus movement during tissue morphogenesis. *PNAS* 109 (47):19298-303.
11. Jianglan Liu, Yuting Zhao, Yujie Sun, Bing He, Changsong Yang, Tatyana Svitkina, Yale Goldman, Wei Guo (2012) Exo70 stimulates the Arp2/3 complex for lamellipodia formation and directional cell migration. *Curr Biol* 22 (16):1510-5.
12. Bing He and Wei Guo (2009) The exocyst complex in polarized exocytosis. Review. *Current Opinion in Cell Biology* 21(4):537-42.
13. Xiaoyu Zhang, Kelly Orlando, Bing He, Fengong Xi, Jian Zhang, Allison Zajac, Wei Guo (2008) Membrane association and functional regulation of Sec3 by phospholipids and Cdc42. *Journal of Cell Biology* 180(1):145-58.

14. Bing He, Fengong Xi, Xiaoyu Zhang, Jian Zhang, Wei Guo (2007) Exo70 interacts with phospholipids and mediates the targeting of the exocyst to the plasma membrane. *The EMBO Journal* 26(24):5167.
15. Bing He, Fengong Xi, Jian Zhang, Daniel TerBush, Xiaoyu Zhang, Wei Guo (2007) Exo70p mediates the secretion of specific exocytic vesicles at early stages of the cell cycle for polarized cell growth. *Journal of Cell Biology* 176(6):771-7.

Preprints

- Jiayang Chen, Bing He. Early zygotic gene product Dunk interacts with anillin to regulate Myosin II during *Drosophila* cleavage. (Original Research Article). *Molecular Biology of the Cell*. *In revision*. Preprint: https://www.biorxiv.org/content/10.1101/2022.02.14.480462v1

Invited Talks

1. Bing He (2021) Cooperation and feedback: How do genetically patterned forces drive tissue folding? The Hong Kong University of Science and Technology. LIFS Seminar Series (ONLINE).
2. Bing He (2021) A little push helps: Mechanical bistability enabled by ectodermal compression facilitates *Drosophila* mesoderm invagination. Society for Developmental Biology (SDB) 80th Annual Meeting (ONLINE).
3. Bing He (2021) Mechanical bistability enabled by ectodermal compression facilitates *Drosophila* mesoderm invagination. EMBO Workshop: Cell Polarity and Membrane Dynamics (ONLINE).
4. Bing He (2021) The mechanics of *Drosophila* mesoderm invagination. Northeast SDB Regional Meeting 2021 (ONLINE). (***Meeting rescheduled from 2020 to 2021 by the organizer due to COVID-19*)
5. Bing He (2021) A buckling-like mechanism enabled by ectodermal compression facilitates mesoderm invagination in *Drosophila*. 2021 Annual *Drosophila* Research Conference (ONLINE).
6. Bing He (2018) Regulation of tissue-level coordination during *Drosophila* mesoderm invagination. Northeast SDB Regional Meeting 2018.
7. Bing He, Adam Martin, Eric Wieschaus (2015) Dunk stabilizes actomyosin network during *Drosophila* cellularization. The Biennial Canadian *Drosophila* Research Conference XIII.
8. Bing He, Adam Martin, Eric Wieschaus (2015) Dunk stabilizes the actomyosin network at the leading edge of the cleavage furrows during *Drosophila* cellularization. 2015 Annual *Drosophila* Research Conference.
9. Bing He, Konstantin Doubrovinski, Oleg Polyakov, Eric Wieschaus (2013) Viscous forces mediate tissue deformation during apical constriction-induced epithelial folding. 53th American Society for Cell Biology Annual Meeting.

10. Bing He, Jianglan Liu, Wei Guo (2008) Exo70 interacts with phosphatidylinositol 4,5-bisphosphate and mediates the targeting of the exocyst to the plasma membrane for exocytosis. 48th American Society for Cell Biology Annual Meeting.
11. Bing He and Wei Guo (2008) The critical role of the exocyst component Exo70 in polarized exocytosis. Philadelphia Area Yeast Genetics Meeting.

Posters Presented at Professional Meetings (presenting author underlined)

1. Victoria Bergstein, Wei Chen, and Bing He (2022) The phosphatidylinositol 4-kinase Fwd regulates apical constriction-induced cell shape change during Drosophila gastrulation. Northeast SDB Regional Meeting 2022.
2. Melisa Fuentes, Bing He (2022) Cell polarity determinant Dlg1 regulates the spatial organization and contractile behavior of non-muscle myosin II during tissue morphogenesis. 2022 *Drosophila* Research Conference (ONLINE)
3. Hanqing Guo, Michael Swan, Bing He (2022) Mechanical bistability of the mesoderm facilitates mesoderm invagination during Drosophila gastrulation. 2022 *Drosophila* Research Conference (ONLINE)
4. Jiayang Chen, Melissa Wang, Bing He (2022) Dunk Regulates Cortical Localization of Myosin II during Drosophila Cellularization through Interaction with the Scaffolding Protein Anillin. 2022 *Drosophila* Research Conference (ONLINE)
5. Wei Chen, Bing He (2021) A Feedback Mechanism Mediated by Myosin-dependent Accumulation of Rab11-vesicles Reinforces Apical Constriction. Cell Bio Virtual 2021 (An Online ASCB|EMBO Meeting)
6. Jiayang Chen, Melissa Wang, Bing He (2021) Dunk regulates cortical localization of myosin II during *Drosophila* cellularization through interaction with the scaffolding protein anillin. Cell Bio Virtual 2021 (An Online ASCB|EMBO Meeting)
7. Hanqing Guo, Michael Swan, Bing He. Mechanical bistability during Drosophila mesoderm invagination. Cell Bio Virtual 2021 (An Online ASCB|EMBO Meeting)
8. Wei Chen, Bing He (2021) A Feedback Mechanism Mediated by Myosin-dependent Accumulation of Rab11-vesicles Reinforces Apical Constriction. Society for Developmental Biology (SDB) 80th Annual Meeting (ONLINE).
9. Wei Chen, Bing He (2021) A feedback mechanism mediated by Myosin II-dependent apical targeting of Rab11 vesicles reinforces apical constriction. EMBO Workshop: Cell Polarity and Membrane Dynamics (ONLINE).
10. Melisa Fuentes, Bing He (2021) Cell polarity determinant Dlg1 facilitates epithelial invagination by regulating tissue-scale mechanical coordination. EMBO Workshop: Cell Polarity and Membrane Dynamics (ONLINE).
11. Jiayang Chen, Melissa Wang, Bing He (2021) Dunk regulates cortical localization of myosin II during *Drosophila* cellularization through interaction with the scaffolding protein anillin. 2021 *Drosophila* Research Conference (ONLINE)

12. Hanqing Guo, Michael Swan, Shicheng Huang and Bing He. Mechanical Bistability during *Drosophila* Mesoderm Invagination. Cell Bio Virtual 2020 (An Online ASCB|EMBO Meeting)
13. Jiayang Chen, Melissa Wang and Bing He (2020) Dunk interacts with anillin and regulates its cortical localization during *Drosophila* cellularization. Cell Bio Virtual 2020 (An Online ASCB|EMBO Meeting)
14. Melisa Fuentes, Bing He (2020) Cell polarity determinant Dlg1 facilitates epithelial invagination by regulating tissue-scale mechanical coordination. Cell Bio Virtual 2020 (An Online ASCB|EMBO Meeting)
15. Wei Chen, Bing He (2020) A feedback mechanism mediated by myosin-dependent accumulation of Rab11-vesicles reinforces apical constriction. Cell Bio Virtual 2020 (An Online ASCB|EMBO Meeting)
16. Melisa Fuentes, Bing He (2020) Cell polarity determinant Dlg1 facilitates epithelial invagination by regulating tissue-scale mechanical coordination. SDB 79th Annual Meeting ONLINE.
17. Hanqing Guo, Michael Swan, Bing He (2020) Mechanical bistability during *Drosophila* mesoderm invagination. SDB 79th Annual Meeting ONLINE.
18. Wei Chen, Bing He (2020) A feedback mechanism mediated by myosin-dependent accumulation of Rab11-vesicles reinforces apical constriction. SDB 79th Annual Meeting ONLINE.
19. Jiayang Chen, Melissa Wang and Bing He (2020) Dunk interacts with anillin and regulates its cortical localization during *Drosophila* cellularization. SDB 79th Annual Meeting ONLINE.
20. Bing He and Wei Chen (2020) A feedback mechanism mediated by myosin-dependent accumulation of Rab11-vesicles reinforces cell adhesion and apical constriction. Gordon Research Conference: Signaling by Adhesion Receptors. (***Meeting canceled by the organizer due to COVID-19*)
21. Hanqing Guo, Michael Swan, Bing He (2020) Mechanical bistability during *Drosophila* ventral furrow formation. TAGC2020. (***Meeting moved online by the organizer due to COVID-19*)
22. Jiayang Chen, Melissa Wang and Bing He (2020) Dunk interacts with anillin and regulates cortical myosin dynamics during *Drosophila* cellularization. TAGC2020. (***Meeting moved online by the organizer due to COVID-19*)
23. Sruti Pari, Melisa Fuentes, Bing He (2020) Characterizing the role of *sieve*/*Psc* in regulating mitosis during early *Drosophila* embryogenesis. Northeast SDB Regional Meeting 2020. (***Meeting canceled by the organizer due to COVID-19*)
24. Melisa Fuentes, Bing He (2019) Cell polarity determinant Dlg1 regulates the mechanics of tissue invagination. 60th Annual *Drosophila* Research Conference.
25. Wei Chen, Bing He (2019) A feedback mechanism mediated by myosin-dependent accumulation of Rab11-vesicles reinforces apical constriction. 60th Annual *Drosophila* Research Conference.

26. Jiayang Chen, Melissa Wang and Bing He (2019) Dunk regulates myosin recruitment during *Drosophila* cleavage through its interaction with anillin. 60th Annual *Drosophila* Research Conference.
27. Hanqing Guo, Michael Swan, Eric Wieschaus, Bing He (2019) Investigating the function of Rho1 in early embryogenesis of *Drosophila*. 60th Annual *Drosophila* Research Conference.
28. Samuel Reed, Wei Chen, and Bing He. (2019) Spatiotemporal dynamics of endosome tubulation during *Drosophila* cellularization. 60th Annual *Drosophila* Research Conference.
29. Melisa Fuentes, Bing He (2018) Epithelial polarity proteins regulate the mechanics of invagination. SDB 77th Annual Meeting.
30. Wei Chen, Bing He (2018) Myosin-dependent accumulation and spatial confinement of Rab11-positive vesicles. SDB 77th Annual Meeting.
31. Melisa Fuentes, Bing He (2017) Identifying the molecular and mechanical requirements for coordinated tissue invagination. 2017 ASCB/EMBO Meeting.
32. Wei Chen, Bing He (2017) Apical myosin activation induces Rab11 puncta accumulation near the apical cortex. 2017 ASCB/EMBO Meeting.
33. Bing He, Adam Martin, Eric Wieschaus (2014) Dunk stabilizes the actomyosin network at the leading edge of the cleavage furrows during *Drosophila* cellularization. 54th ASCB/IFCB Meeting.
34. Bing He, Oleg Polyakov, Konstantin Doubrovinski, Eric Wieschaus (2012) Plasma membrane partitioning of syncytial blastoderm into individual cells is critical for tissue invagination during *Drosophila* ventral furrow formation. 52th American Society for Cell Biology Annual Meeting.
35. Bing He, Oleg Polyakov, Eric Wieschaus (2011) How "acellular" embryos gastrulate: Study cytoplasm movements during gastrulation in developing *Drosophila melanogaster* embryos. 51th American Society for Cell Biology Annual Meeting.
36. Bing He, Amy Caudy, Sandeep Raj, Eric Wieschaus (2010) Positioning *Drosophila* centromeric heterochromatin sequences by comparative genomic hybridization analysis. 50th American Society for Cell Biology Annual Meeting.
37. Bing He, Fengong Xi, Xiaoyu Zhang, Jian Zhang, Wei Guo (2007) Exo70 interacts with phospholipids and mediates the targeting of the exocyst to the plasma membrane. 47th American Society for Cell Biology Annual Meeting.
38. Bing He, Fengong Xi, Jian Zhang, Xiaoyu Zhang, Wei Guo (2006) Exo70p mediates the secretion of specific exocytic vesicles at early stages of cell cycle for polarized cell growth. 46th American Society for Cell Biology Annual Meeting.

Courses taught:

BIOL12: Cell Structure and Function (Undergraduate course with lab)
Spring 2016 (co-taught with Amy Gladfelter, 53 students enrolled)

BIOL263: Res Colloq: Cell Biology (Graduate course)
Winter 2017 (16 students enrolled)

BIOL12: Cell Structure and Function (Undergraduate course with lab)
Spring 2017 (co-taught with Sharon Bickel, 91 students enrolled)

BIOL41: Cells into Organs: Assembly, Function and Disease (Undergraduate course)
Fall 2017 (A new course designed by Bing He, 17 students enrolled)

BIOL263: Res Colloq: Cell Biology (Graduate course)
Winter 2018 (9 students enrolled)

BIOL12: Cell Structure and Function (Undergraduate course with lab)
Spring 2018 (59 students enrolled)

BIOL41: Cells into Organs: Assembly, Function and Disease (Undergraduate course)
Fall 2018 (12 students enrolled)

BIOL263: Res Colloq: Cell Biology (Graduate course)
Winter 2019 (21 students enrolled)

BIOL12: Cell Structure and Function (Undergraduate course with lab)
Spring 2019 (46 students enrolled)

BIOL41: Cells into Organs: Assembly, Function and Disease (Undergraduate course)
Fall 2019 (14 students enrolled)

BIOL263: Res Colloq: Cell Biology (Graduate course)
Winter 2020 (18 students enrolled)

BIOL12: Cell Structure and Function (Undergraduate course with lab)
Spring 2020 (co-teaching the two sections of the course remotely with Magdalena Bezanilla. 125 students enrolled for both sections at the beginning of the term)

BIOL41: Cells into Organs: Assembly, Function and Disease (Undergraduate course)
Fall 2020 (teaching the course remotely*; 10 students enrolled)
*Restructuring the course to include both synchronous and asynchronous components. All lectures were delivered asynchronously as online recordings, whereas the synchronous meetings were used to perform literature presentations and group problem-solving activities).

BIOL41: Cells into Organs: Assembly, Function and Disease (Undergraduate course)
Fall 2021 (14 students enrolled)

BIOL263: Res Colloq: Cell Biology (Graduate course)
Winter 2021 (21 students enrolled)