

# Clifford Paul Brangwynne

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## EDUCATION

### **Harvard University**

Ph.D. Applied Physics, June 2007

### **Carnegie Mellon University**

B.S. Materials Science & Engineering, minor in Physics, with University Honors,  
May 2001

## PROFESSIONAL APPOINTMENTS

### **Princeton University**

11/20-Present June K. Wu '92 Professor of Engineering  
9/20-Present Director, Princeton Bioengineering Initiative  
7/19-10/20 Professor, Chemical and Biological Engineering  
7/17- 6/19 Associate Professor, Chemical and Biological Engineering  
1/11-6/17 Assistant Professor, Chemical and Biological Engineering  
Associated Faculty, Lewis Sigler Institute, Quant. & Comp. Biology Program  
Associated Faculty, Molecular Biology  
Associated Faculty, Princeton Institute for the Science & Technology of Material

### **Howard Hughes Medical Institute**

9/18-Present HHMI Investigator

### **Max Planck Institute for Molecular Cell Biology and Genetics,**

8/07-12/10 **& MPI for Physics of Complex Systems, Dresden, Germany**  
Postdoctoral training with Profs. Tony Hyman (MPI-CBG) and Frank Jülicher (MPI-PKS).

### **Harvard University**

5/02 –7/07 Doctoral research in the laboratory of Prof. David A. Weitz. Ph.D. Thesis title:  
“Mechanics and dynamics of microtubule bending”

### **Harvard Medical School, Department of Pathology**

6/98 – 3/99 Researched directional cell migration and tissue morphogenesis  
6/99 – 8/99 using light microscopy and soft lithographic cell patterning,  
12/99 – 1/00 laboratory of Prof. Donald Ingber.

## PROFESSIONAL

### COURSES (TAKEN)

#### **Marine Biological Laboratory, Woods Hole, MA**

“Physiology: Modern Cell Biology Using Microscopic, Biochemical and Computational Approaches”, Summer 2006 (7 Weeks)

#### **Ecole de Physique, Les Houches, France**

“Physics of the Cell”, March 2004 (2 Weeks)

## FELLOWSHIPS,

### AWARDS & HIGHLIGHTS

- Tsuneko & Reiji Okazaki Award, 2021
- HFSP Nakasone Award, 2020
- Wiley Prize in Biomedical Sciences, 2020
- Blavatnik Awards for Young Scientists, 2020 National Laureate
- Michael and Kate Bárány Award, Biophysical Society, 2020
- Marine Biological Laboratories, Friday Evening Lecture (originally 7/10/20)
- JCB/JEM Neurodegeneration Symposium, Keynote Lecture (originally 9/15/20)
- EMBL Phase Separation Conference, Keynote Lecture (originally 5/10/20)
- MacArthur Fellow, 2018-2023
- Keystone Condensate Conference, Keynote Lecture, 2019
- Caltech Vaughan Lecture, 2019
- APS Kavli Lecture, 2019
- iBiology Online Seminars, 2018 (viewed >37k times)
- HHMI Investigator, 2018-
- HHMI-Simons Faculty Scholar, 2016-2018
- ASCB-Gibco Emerging Leader Award, 2015
- Howard B. Wentz Jr., Junior Faculty Award, 2014
- Sloan Research Fellow, 2014
- NSF CAREER Award, 2013
- NIH New Innovator Award, 2012
- Searle Scholar Award, 2012
- Princeton Engineering Commendation List for Outstanding Teaching (*CBE 433/533 Mech. & Dynamics of Soft Living Matter; S11, F15, F16*)
- Helen Hay Whitney Fellowship, 2008-2010
- MPI-PKS, Dresden: Visiting Fellowship, 2007-2008

## PRESS

<https://www.newyorker.com/magazine/2022/03/07/a-journey-to-the-center-of-our-cells/amp>  
<https://endpts.com/softbank-leads-150m-round-into-dewpoint-as-condensate-biotech-nears-clinic/>  
<https://paw.princeton.edu/article/toolmakers-mind>  
<https://www.nature.com/articles/s41587-021-00828-4>  
<https://discovery.princeton.edu/2020/12/16/of-lava-lamps-and-living-cells/>  
<https://www.chemistryworld.com/features/how-does-a-cell-know-what-kind-of-cell-it-should-be/4012667.article>  
<https://www.towntopics.com/wordpress/2020/10/28/princeton-professor-is-2020-winner-of-blavatnik-award-for-young-scientists/>  
<https://www.pnas.org/doi/10.1073/pnas.2017799117>  
<https://www.quantamagazine.org/molecular-condensates-in-cells-may-hold-keys-to-lifes-regulation-20210107/>  
<https://cen.acs.org/biological-chemistry/biochemistry/Transient-droplets-organize-biochemical-reactions/98/i27>  
<https://www.science.org/doi/10.1126/science.371.6527.336>  
<https://www.npr.org/sections/health-shots/2020/07/08/888687912/new-clues-to-als-and-alzheimers-from-physics>  
<https://www.nature.com/articles/s41592-020-0855-3>  
<https://www.nature.com/articles/d41573-019-00069-w>  
<https://alumni.princeton.edu/stories/cliff-brangwynne-seeks-symphony-science-cells>  
<https://www.scientificamerican.com/article/lava-lamp-proteins-may-help-cells-cheat-death/>  
<https://www.bostonglobe.com/metro/2018/10/04/three-boston-area-figures-among-macarthur-fellows/X4kOeQ0GYnxkP6NOFJMgTO/story.html>  
<https://patch.com/new-jersey/princeton/2-princeton-professors-awarded-macarthur-genius-grant>  
<https://engineering.princeton.edu/news/2018/10/04/brangwynne-named-2018-macarthur-fellow-work-bioengineering>  
<https://www.towntopics.com/wordpress/2018/05/23/brangwynne-wins-8m-for-biomedical-research/>  
<https://knowablemagazine.org/article/living-world/2020/what-is-liquid-liquid-phase-separation>  
<https://www.nature.com/articles/d41586-018-03070-2>  
<https://www.science.org/doi/pdf/10.1126/science.334.6059.1048>  
<https://rupress.org/jcb/article/214/2/122/38578/Cliff-Brangwynne-All-the-right-materials>

CITIZENSHIP United States of America, Republic of Ireland

LANGUAGES English, Spanish (conversational), German (conversational)

## PUBLICATIONS

Google Scholar:

[https://scholar.google.com/citations?user=wAoRV\\_AAAAAJ&hl=en&oi=sra](https://scholar.google.com/citations?user=wAoRV_AAAAAJ&hl=en&oi=sra)

As of March 15, 2022, *Total Citations*: 16,072; *H-Index*: 46

§ = Authors contributed equally

† = Corresponding Author

78. Lee DSW, Choi C-H, Sanders DW, Beckers L, Riback J, Brangwynne CP†, Wingreen NS†. A rich get richer effect governs intracellular condensate size distribution. *BioRxiv* 2022

77. Lee DSW, Strom A, Brangwynne CP†. The mechanobiology of nuclear phase separation. *APL Bioengineering*, in revision.
76. Keber FC, Nguyen T, Brangwynne CP†, Wuhr M†, Evidence for widespread cytoplasmic structuring into mesoscopic condensates. *BioRxiv* 2022  
doi: <https://doi.org/10.1101/2021.12.17.473234>
75. Riback J§, Eeftens JM§, Lee DSW§, Quinodoz SA, Beckers L, Becker LA, Brangwynne CP†. Viscoelastic RNA entanglement and advective flow underlie nucleolar form and function. *BioRxiv* 2022 <https://www.biorxiv.org/content/10.1101/2021.12.31.474660v1>
74. Gouveia B§, Kim Y§, Shaevitz J, Petry S, Stone HA†, Brangwynne CP†. Capillary forces in living cells. (Perspective article, in revision, *Nature*)
73. Rana U, Brangwynne CP, Panagiatopoulos†. Phase separation versus aggregation behavior for model disordered proteins. *Journal of Chemical Physics* 2021 (Cover article, Editor's pick, in press) <https://doi.org/10.1063/5.0060046>
72. Shimobayashi S, Sanders DW, Ronceray P, Haataja M, Brangwynne CP†. Nucleation landscape of biomolecular condensates. *Nature* 2021 <https://doi.org/10.1038/s41586-021-03905-5>
71. Sanders DW, Jumper CC, Ackerman PJ, Bracha D, Donlic A, Kim H, Kenney D, Castello-Serrano I, Suzuki S, Tamura T, Tavares AH, Saeed M, Holehouse AS, Ploss A, Levental I, Douam F, Padera RF, Levy BD, Brangwynne CP†. SARS-CoV-2 requires cholesterol for viral entry and pathological syncytia formation. *eLife* 2021 DOI:10.7554/eLife.65962
70. Zhang Y§, Lee DSW§, Meir Y, Brangwynne CP, Wingreen NS†. Mechanical frustration of phase separation in the cell nucleus by chromatin. *Physical Review Letters* 2021 <https://doi.org/10.1103/PhysRevLett.126.258102>
69. Jack A§, Kim Y§, Stom A§, Lee DSW, Williams B, Schaub JM, Kellogg EH, Finkelstein IJ, Ferro LS, Yildiz A†, Brangwynne CP†. Compartmentalization of telomeres through DNA-scaffolded phase separation. *Developmental Cell* 2022, DOI: 10.1016/j.devcel.2021.12.017
68. Amy R. Strom§, Ronald J. Biggs§, Edward J. Banigan§, Xiaotao Wang, Katherine Chiu, Cameron Herman, Jimena Collado, Feng Yue, Joan C. Ritland Politz, Leah J. Tait, David Scalzo, Agnes Telling, Mark Groudine, Clifford P. Brangwynne, John F. Marko, Andrew D. Stephens†. HP1 $\alpha$  is a chromatin crosslinker that controls nuclear and mitotic chromosome mechanics. *Elife* 2021 DOI:10.7554/eLife.63972
67. Eeftens JM, Kapoor M, Brangwynne CP†. Polycomb condensates can promote epigenetic marks but are not required for sustained chromatin compaction. *Nature Communications* 2021 <https://doi.org/10.1038/s41467-021-26147-5>
66. Safari MS, King MR, Brangwynne CP, Petry S†. Interaction of spindle assembly factor TPX2 with importins- $\alpha/\beta$  inhibits protein phase separation. *Journal of Biological Chemistry*, 2021 DOI:<https://doi.org/10.1016/j.jbc.2021.100998>
65. Mark Esposito, Cao Fang, Katelyn Cook, Nana Park, Yong Wei, Chiara Spadazzi, Dan Bracha, Hannah Slabodkin, Ramesh Gunaratna, Gary Laevsky, Christina DeCoste, Clifford P. Brangwynne, Ileana M. Cristea, Yibin Kang†. TGFbeta-induced

- Dact1 biomolecular condensates repress Wnt signaling via multivalent protein-protein interactions. *Nature Cell Biology*, 2021 DOI: 10.1038/s41556-021-00641-w
64. Lee DSW, Wingreen N, Brangwynne CP†. Chromatin mechanics dictates sub-diffusion and coarsening dynamics of embedded condensates. *Nature Physics*, 2021 <https://doi.org/10.1038/s41567-020-01125-8>
  63. Treen N, Shimobayashi SF, Eeftens J, Brangwynne CP, Levine MS†. Properties of Repression Condensates in Living Ciona Embryos. *Nature Communications*, 2021 12:1561
  62. Lafontaine DLJ § †, Riback JA §, Bascetin R, Brangwynne CP†. The nucleolus as an active multiphase condensate. *Nature Reviews in Cell and Molecular Biology*, 2020 <https://doi.org/10.1038/s41580-020-0272-6>
  61. Statt A§, Casademund H§, Brangwynne CP, Panagiatopoulos AZ†. Model for disordered proteins with strongly sequence-dependent liquid phase behavior. *The Journal of Chemical Physics*, 152:075101, 2020
  60. Riback JA§, Zhu L§, Ferrolino MC, Tolbert M, Mitrea DM, Sanders DW, Wei M-T, Kriwacki RW†, Brangwynne CP†. Composition dependent thermodynamics of intracellular phase separation. *Nature*, 581, 209-214, 2020
  59. Sanders DW, Kedersha N, Lee DSW, Strom AR, Drake V, Bracha D, Riback JA, Bracha D, Eeftens JM, Iwanicki A, Jacobs W, Wang A, Wei MT, Whitney G, Lyons SM, Anderson PJ, Ivanov P, Brangwynne CP†. Competing protein interaction networks control multiphase intracellular organization. *Cell*, 181(2):306-324, 2020
  58. Wei M-T, Chang Y-C, Shimobayashi SF, Shin Y, Brangwynne CP†. Nucleated transcriptional condensates amplify gene expression. *Nature Cell Biology*, 22 1187-1196, 2020
  57. Bracha D, Walls M, Brangwynne CP†. Probing and engineering liquid-phase organelles. *Nature Biotechnology*, 37,1435–1445, 2019
  56. Riback JA, Brangwynne CP†. Can phase separation buffer cellular noise? *Science*, 367:6476:364-365, 2020
  55. Strom A, Brangwynne CP†. The Liquid Nucleome: Phase Transitions in the Nucleus at a Glance. *Journal of Cell Science*, doi: 10.1242/jcs.235093, 2019
  54. Taylor NO, Wei MT, Stone HA, Brangwynne CP†. Quantifying phase-separated protein condensates using fluorescent recovery after photobleaching. *Biophysical Journal*, 117(7):1285-1300, 2019
  53. Zhu L, Richardson TM, Wacheul L, Wei MT, Feric M, Whitney G, Lafontaine DLJ, Brangwynne CP†. Controlling the viscoelasticity and rRNA processing function of the nucleolus using light. *PNAS*, 116(35), 2019
  52. Bracha D, Walls MT, Wei MT, Zhu L, Kurian M, Avalos JL, Toettcher JE, Brangwynne CP†. Mapping local and global liquid phase behavior in living cells using photo-oligomerizable seeds. *Cell*, 175(6):1467-1480, 2018
  51. Shin Y, Chang Y-C, Lee DSW, Berry J, Sanders DW, Ronceray P, Wingreen N.S., Haataja M.P., Brangwynne CP†. Liquid nuclear condensates mechanically sense and restructure the genome. *Cell*, 175(6):1481-1491, 2018

50. Dine E, Gil A, Uribe G, Brangwynne CP, Toettcher JE<sup>†</sup>. Protein phase separation provides long term memory of transient spatial stimuli. *Cell Systems*, 2018
49. Berry J, Brangwynne CP<sup>†</sup>, Haataja MP<sup>†</sup>. Physical Principles of Biomolecular Organization in Living Cells via Active and Passive Phase Transitions. *Reports on Progress in Physics*, 81(4), 2018
48. Shin Y, Brangwynne CP<sup>†</sup>. Liquid phase condensation in cell physiology and disease. *Science* 357(6357)eaaf4382, 2017
47. Sanders DW<sup>†</sup>, Brangwynne CP<sup>†</sup>. Neurodegenerative disease: RNA repeats put a freeze on cells. *Nature*, 546(7657), 2017
46. Shivers J, Uppaluri S, Brangwynne CP<sup>†</sup>. Microfluidic immobilization and subcellular imaging of developing *Caenorhabditis elegans*. *Biomicrofluidics*, 2017 (doi:10.1007/s10404-017-1988-2)
45. Wei SMT, Holehouse A, Elbaum-Garfinkle S, Arnold C, Priestley RD, Pappu RV<sup>†</sup>, Brangwynne CP<sup>†</sup>. Phase behavior of disordered proteins underlying low density and high permeability of liquid organelles. *Nature Chemistry*, 9: 1118–1125, 2017
44. Shin Y, Berry J, Pannucci N, Haataja MP, Toettcher JE<sup>†</sup>, Brangwynne CP<sup>†</sup>. Spatiotemporal control of intracellular phase transitions using light-activated Optodroplets, *Cell*, 168(1-2): 159-171, 2017
43. Thutupalli S<sup>†§</sup>, Uppaluri S<sup>†§</sup>, Constable GWA, Levin SA, Stone HA, Tarnita CE, Brangwynne CP<sup>†</sup>. Farming and public goods production in *C.elegans* populations. *Proceedings of the National Academy of Sciences USA*, 114(9)2289-2294, 2017
42. Taylor N, Elbaum-Garfinkle S, Vaidya N, Zhang H, Stone HA, Brangwynne CP<sup>†</sup>. A microfluidic platform for measuring the properties and phase behavior of organelle-based RNA/protein liquid phases. *Soft Matter*, 12:9142-9150, 2016
41. Uppaluri S, Weber S, Brangwynne CP<sup>†</sup>. Hierarchical size scaling during multicellular growth and development. *Cell Reports*, 17:345-352, 2016
40. Brangwynne CP<sup>†</sup>, Marko J<sup>†</sup>. A sticky problem for chromosomes. *Nature*, 535:234-235, 2016
39. Feric M<sup>§</sup>, Vaidya N<sup>§</sup>, Harmon TS, Mitrea DM, Zhu L, Richardson TM, Kriwacki RW, Pappu RV, Brangwynne CP<sup>†</sup>. Coexisting liquid phases underlie nucleolar sub-compartments. *Cell*, 165(7):1686-1697, 2016
38. Elbaum-Garfinkle S, Brangwynne CP<sup>†</sup>. Liquids, fibers, and gels: The many phases of neurodegeneration. *Developmental Cell*, 35(5):531-532, 2015
37. Zhang H, Elbaum-Garfinkle S, Langdon E, Taylor N, Occhipinti P, Bridges A, Brangwynne CP<sup>†</sup>, Gladfelter AS<sup>†</sup>. RNA controls PolyQ protein phase transitions. *Molecular Cell*, 60(2):220-230, 2015
36. Brangwynne CP<sup>†</sup>, Tompa P, Pappu RV. Phase transitions and the polymer physics of intracellular organization. *Nature Physics* 11:899-904, 2015
35. Bosse J, Hogue IB, Feric M, Thiberge SY, Sodeik B, Brangwynne CP, Enquist LW. Remodeling nuclear architecture allows efficient transport of herpesvirus capsids by diffusion. *Proceedings of the National Academy of Sciences USA*, 112(42): E5725-E5733, 2015

34. Berry J<sup>§</sup>, Weber SC<sup>§</sup>, Vaidya N, Haataja M<sup>†</sup>, Brangwynne CP<sup>†</sup>. RNA transcription modulates phase transition-driven nuclear body assembly. *Proceedings of the National Academy of Sciences USA*, 112(38):E5237-E5245, 2015
33. Uppaluri S, Brangwynne CP<sup>†</sup>. A size threshold governs *Caenorhabditis elegans* developmental progression. *Proceedings of Royal Society B*, 282: 20151283, 2015
32. Feric M, Broedersz C, Brangwynne CP<sup>†</sup>. Soft viscoelastic properties of nuclear actin age oocytes due to gravitational creep. *Scientific Reports*, 5:16607, 2015
31. Elbaum-Garfinkle S, Kim Y, Szczepaniak C, Eckmann C, Myong S, Brangwynne CP<sup>†</sup>. The disordered P granule protein LAF-1 drives phase separation into droplets with tunable viscosity and dynamics. *Proceedings of the National Academy of Sciences USA*, 112(23):7189-7194, 2015
30. Gilpin W, Uppaluri S, Brangwynne CP<sup>†</sup>. Worms under pressure: bulk mechanical properties of *C.elegans* are independent of the cuticle. *Biophysical Journal*, 108:1887-1898, 2015
29. Zhu L, Brangwynne CP<sup>†</sup>. Nuclear Bodies: The emerging biophysics of nucleoplasmic phases. *Current Opinion in Cell Biology*, 34:23-30, 2015
28. Weber SC, Brangwynne CP<sup>†</sup>. Inverse size scaling of the nucleolus by a concentration-dependent phase transition. *Current Biology*, 25(5):641-646, 2015
27. Brangwynne CP<sup>†</sup>. Phase transitions and size scaling of membrane-less organelles. *Journal of Cell Biology*, 203(6):875-881, 2013
26. Feric M, Brangwynne CP<sup>†</sup>. A nuclear F-actin scaffold stabilizes ribonucleoprotein droplets against gravity in large cells. *Nature Cell Biology*, 15:1253-1259, 2013
25. Lee C-F, Brangwynne CP, Gharakhani J, Hyman AA, Jülicher F. Spatial organization of cell cytoplasm by position-dependent phase separation. *Physical Review Letters*, 111(8):088101, 2013
24. Broedersz CP, Brangwynne CP<sup>†</sup>. Nuclear mechanics: lamin webs and pathological blebs. *Nucleus*, 4(3):156-159, 2013
23. Brangwynne CP<sup>†</sup>, Johnson TL<sup>†</sup>. The micro and macro of RNA function. *Molecular Biology of the Cell*, 24(6):679, 2013
22. Shan WL, Chen Z, Broedersz C, Gumaste AA, Soboyejo WO, Brangwynne CP<sup>†</sup>. Attenuated short wavelength buckling and force propagation in a biopolymer-reinforced rod. *Soft Matter*, 9:194-199, 2012
21. Brangwynne CP<sup>†</sup>, Hyman AA<sup>†</sup>. In retrospect: Oparin and the origin of life. *Nature*, 491:524-5, 2012
20. Weber SC, Brangwynne CP<sup>†</sup>. Getting RNA and protein in phase. *Cell*, 149:1188:1191, 2012
19. Hyman AA<sup>†</sup>, Brangwynne CP<sup>†</sup>. Beyond stereo-specificity: liquids and mesoscale organization of cytoplasm. *Developmental Cell*, 21:14-16, 2011
18. Brangwynne CP<sup>†</sup>. Soft active aggregates: mechanics, dynamics and self-assembly of liquid-like intracellular protein bodies. *Soft Matter*, 7:3052-3059, 2011
17. Brangwynne CP<sup>†</sup>, Mitchison TJ, Hyman AA. Active liquid-like behavior of nucleoli determines their size and shape in *Xenopus laevis* oocytes. *Proceedings of the National Academy of Sciences USA*, 108(11):4334-4339, 2011

16. Greenan G, Brangwynne CP, Jaensch S, Gharakhani J, Jülicher F, Hyman AA. Centrosome size sets mitotic spindle length in *Caenorhabditis elegans* embryos. *Current Biology*, 20:353-358, 2010
15. Brangwynne CP, Eckmann CR, Courson DS, Rybarska A, Hoege C, Gharakhani J, Jülicher F, Hyman AA. Germline P granules are liquid droplets that localize by controlled dissolution/condensation. *Science*, 324: 1729-1732, 2009
14. Brangwynne CP, Koenderink GH, MacKintosh FC, Weitz DA. Intracellular transport by active diffusion. *Trends in Cell Biology*, 19(9):425-427, 2009
13. Brangwynne CP, Koenderink GH, MacKintosh FC, Weitz DA. Cytoplasmic diffusion: molecular motors mix it up. *Journal of Cell Biology*, 183(4):583-7, 2008
12. Groen AC, Needleman D, Brangwynne CP, Gradinaru C, Fowler B, Mazitschek R, Mitchison TJ. A novel small-molecule inhibitor reveals a possible role of kinesin-5 in anastral spindle-pole assembly. *Journal of Cell Science*, 121(Pt 14):2293-3000, 2008
11. Brangwynne CP, MacKintosh FC, Weitz DA. Force fluctuations and polymerization dynamics of intracellular microtubules. *Proceedings of the National Academy of Sciences USA*, 104(41):16128-16133, 2007
10. Brangwynne CP, Koenderink GH, Barry E, Dogic Z, MacKintosh FC, Weitz DA. Bending dynamics of fluctuating biopolymers probed by automated high-resolution filament tracking. *Biophysical Journal*, 91(1): 346-359, 2007
9. Brangwynne CP, Koenderink GH, MacKintosh FC, Weitz DA. Nonequilibrium microtubule fluctuations in a model cytoskeleton. *Physical Review Letters*, 100(11):118104, 2008
8. Leung LY, Tian DT, Brangwynne CP, Weitz DA, Tschumperlin DJ. A new microrheometric approach reveals individual and cooperative roles for TGF- $\beta$ 1 and IL-1 $\beta$  in fibroblast-mediated stiffening of collagen gels. *FASEB Journal*, 21(9):2064-2073, 2007
7. Kasza KE, Rowat AC, Liu J, Angelini TE, Brangwynne CP, Koenderink GH, Weitz DA. The cell as a material. *Current Opinion in Cell Biology*, 19(1): 101-107, 2007
6. Brangwynne CP, MacKintosh FC, Kumar S, Geisse NA, Talbot J, Mahadevan L, Parker KK, Ingber DE, Weitz DA. Microtubules can bear enhanced compressive loads in living cells because of lateral reinforcement. *Journal of Cell Biology*, 173(5): 733-741, 2006
5. Huang S<sup>§</sup>, Brangwynne CP<sup>§</sup>, Parker KK, Ingber DE. Symmetry-breaking in mammalian cell cohort migration during tissue pattern formation: Role of random-walk persistence. *Cell Motility and the Cytoskeleton*, 61(4):201-213, 2005
4. Kaufman LJ, Brangwynne CP, Kasza KE, Filippidi E, Gordon VD, Deisboeck TS, Weitz DA. Glioma expansion in collagen I matrices: analyzing collagen concentration-dependent growth and motility patterns. *Biophysical Journal*, 89(1):635-650, 2005
3. Parker KK, Brock AL, Brangwynne CP. *et.al.* Directional control of lamellipodia extension by constraining cell shape and orienting cell tractional forces. *FASEB Journal*, 16:1195-1204, 2002



2. Brangwynne CP, Huang S, Parker KK, Ingber DE. Symmetry-breaking in mammalian populations migrating in vitro. *In Vitro Cell and Developmental Biology Animal*, 36:563-5, 2000
1. Chen CS, Brangwynne CP, Ingber DE. Pictures in cell biology: squaring up to the cell shape debate. *Trends in Cell Biology*, 9:283, 1999

## BOOK CHAPTERS

- Goldmann W, Alonso JL, Bojanowski K, Brangwynne CP. et. al. Cell Shape Control and Mechanical Signalling through the Cytoskeleton. In: *The Cytoskeleton and Signalling: A Practical Approach*. : Carraway, K, Oxford, England: Oxford University Press, 245-276, 1999
- Gardel ML, Kasza KE, Brangwynne CP, Liu J, Weitz DA. Ch.19 Mechanical Response of Cytoskeletal Networks, In: *Methods in Cell Biology*, eds. John J. Correia and H. William Detrich, III, 89:487-519, 2008

## TEXTBOOK CONTRIBUTIONS

- Molecular Biology of the Cell, Alberts et.al. 9th Edition, Figure 3-78 adapted from Brangwynne et.al. *PNAS* 2011
- (Cover Image) Cell and Molecular Biology: Concepts and Experiments, Gerald Karp, 3<sup>rd</sup> Edition
- (Cover Image) Laboratory Investigations in Cell and Molecular Biology, Allyn Bregman, 4<sup>th</sup> Edition

## PATENTS

- “Optogenetic tool for rapid and reversible clustering of proteins”, Brangwynne CP, Toettcher JE, Shin Y. US10533167B2
- “Disordered protein-based seeds for molecular clustering”, Brangwynne CP, Bracha D. US20200095569A1
- “System and method for inducing clusters of gene regulatory proteins targeted to specific genetic loci” US20210047659A1 Brangwynne CP, Shin Y, Bracha D
- “High throughput method and system for mapping intracellular phase diagrams”, Brangwynne CP, Bracha D, Jumper C, Ackerman P. US 2021/0350875
- “System and method for modulating stress granule assembly”, Brangwynne CP, Drake V, Sanders DW. WO2020014588A1
- <Numerous other provisional and full patent applications have been filed>.

## ENTREPRENEURSHIP

Co-Founder, Nereid Therapeutics (Chair SAB, Consultant)

## RESEARCH

### FUNDING

- (PI) Multidisciplinary University Research Initiative (MURI), Air Force Office of Scientific Research, “Uncovering and applying the interfacial design principles of multiphasic natural and synthetic organelles

- (PI) Howard Hughes Medical Institute, Transformative Technology Award, “NanoCIE: Nanoscale Condensate Imaging and Engineering Facility” 2019
- (PI) Princeton SEAS Focused Research Team, “Engineering Intracellular Organelles” 10/1/2018-9/30/2021
- (PI) Investigator, Howard Hughes Medical Institute, 9/1/2019-8/31/2026 (first seven year appointment)
- (co-PI) US-Israel Binational Science Foundation, “Architecture and stability of non-membranated organelles investigated by novel cryo-electron tomography”. 3/1/2017-2/28/2020
- (PI) Howard Hughes Medical Institute & Simons Foundation, 11/1/2016-10/31/2018, HHMI-Simons Faculty Scholar Award
- (PI) Defense Advanced Research Projects Agency (DARPA), 11/1/2016-10/31/2017 “Cyborg Computation with Liquid Phases of Cytoplasm”
- (PI) National Institutes of Health (1DP2 GM105437-01), 09/2012-08/2017 NIH New Innovator Award “Cell Growth Control by Cell and Organelle Size-Dependent Ribosome Biogenesis”
- (co-PI) St. Jude Children’s Research Hospital, 12/2016-11/2021; renewed through 2026 Consortium on “Intracellular Phase Transitions in Health and Disease”
- (PI) National Institutes of Health (U01 DA040601-01), 09/2015-8/2018 “Optogenetic droplets: Using light to control nucleoplasmic phase separation”
- (PI) National Science Foundation (PHY-1253035), 09/2013-08/2018 “CAREER: Non-equilibrium RNA/Protein Liquids and Intracellular Phase Transitions”
- (PI) Human Frontier Science Program (RGP0007/2012), 10/2012-09/2015 “RNA Helicases in RNA/Protein Body Assembly and Function: A Multi-scale Approach”
- (PI) Searle Scholars Program, 07/2012-06/2015 “Scaling Nucleolar Function for Cell Growth Control”
- (co-PI) Eric and Wendy Schmidt Transformative Technology Fund, 4/2014-4/2016 “A Three-Dimensional NanoRheometer (3-DNR) for Soft Matter Research”
- (co-PI) National Science Foundation (MRSEC DMR-0819860), 01/2014-10/2020 “Structure and Dynamics in Confined Polymers”
- (PI) Alfred P. Sloan Foundation (BR2014-002), 09/2014-09/2016 Sloan Research Fellowship in Computational & Evolutionary Molecular Biology
- (PI) Howard B. Wentz Junior Faculty Award, 9/2014-8/2016

## C ONFERENCE O RGANIZATION

- Princeton University, “Phase Behavior in Soft and Living Matter”, two-day hybrid in-person/virtual symposium including speakers from Duke, UNC Chapel Hill, Washington University in St. Louis, Nov 18-19, 2021
- Princeton University, Princeton Bioengineering Initiative, virtual one-day symposium with speakers from Princeton, Berkeley, MIT, Bristol Myers Squibb, Genmab, Johnson & Johnson, and Medtronic, Nov 20, 2020
- Princeton University, Biomolecular Condensate Initiative, Virtual mini-symposium, May 27, 2020 (One-day, 12 Princeton speakers)
- New York Academy of Science Meeting on “Phase Separation in Biology and Disease”, New York, NY, Feb 20, 2019
- EMBL Meeting on “Cellular Mechanisms Driven by Phase Separation”, Heidelberg, Germany, May 14-18, 2018,
- 2015 Annual Meeting of the American Society of Cell Biology, San Diego, December 2015, Co-organizer of Symposium on “Nucleation Phenomena in Cell Biology”
- Princeton Center for Theoretical Science (PCTS), Program on Phase Transitions in Cell Biology, April 20-22, 2015
- 2014 AIChE Annual Meeting, Atlanta, Co-chair session on Cellular Biomechanics
- 2014 Annual Meeting of the American Physical Society, Denver, Chair of Symposium on Phase Transitions in Cells
- 2013 Annual Meeting of the American Society of Cell Biology, New Orleans, Chair (substitute) of Frontier Symposium on “Physical Biology of the Cell”
- 2013 Annual Meeting of the American Society of Cell Biology, New Orleans, December 2013, Co-organizer of Symposium on “Physical Approaches to Nuclear Structure and Function”
- 2012 Annual Meeting of the American Society of Cell Biology, Mini-symposium Co-organizer, “Micro and Coding RNA”
- Mini-Meeting on “RNA/Granule Assembly”, Princeton, May 2012

## T EACHING

- Princeton Wintersession 2022, “BioEntrepreneurship: Translating Academic Research into Biotech Impact”, Jan 17-21, 2022 - lead course instructor, co-taught with Tony Williams (OTL)
- Introduction to Cellular and Molecular Biology, MOL 214 (co-taught w/ Prof. Dan Notterman): F18, F21
- Mechanics and Dynamics of Soft Living Matter, CBE 433/533: S11, F12, F14, F15, F16, F17, S19, S20, S21

- Advanced Heat and Mass Transfer, CBE 505: S13,S14, S15, S16, S17
- Physiology Course Instructor, Marine Biological Laboratory, Woods Hole, MA Summer 2019 (2 weeks), Summer 2022 (planned)
- Guest Lecturer:
  - Electricity, Magnetism, and Photonics EGR 153 (S22)
  - Graduate Seminar in Biomed. Eng., ELE547 (S13)
  - Developmental Biology, MOL507 (F12)
  - Polymer Viscoelasticity, CBE542 (S15)
  - Method & Logic in Quantitative Biology, MOL515 (F12, F13, F14, F15, F16, F17, F18, F20)

## MENTORING

### *Graduate Students*

#### *Current*

- Mack Walls (G6, Chem. & Biol. Eng., co-advised w/ Jose Avalos; NSF Fellow)
- Yi-Che Chang (G6, Chemistry)
- Chang-Hyun Choi (G5, Chem. & Biol. Eng.)
- Ushnish Rana (G4, Chem. & Biol. Eng.; co-advised w/ Thanos Panagiatopoulos)
- Yoonji Kim (G4, Mol. Biol.)
- Jessica Zhao (G3, Chem. & Biol. Eng.)
- Kevin Xu (G3, Chem. & Biol. Eng.; co-advised w/ Jose Avalos)
- Jordy Botello (G2, Mol. Biol.)
- Claire Weaver (G2, Mol. Biol.; co-advised w/ Mike Levine)
- Lennard Wiesener (G1, Chem. & Biol. Eng.)
- Hailey Tanner (G1, Chem. & Biol. Eng.)
- Hansen Tjo (G1, Chem. & Biol. Eng.; co-advised w/ Jose Avalos)
- Lifei Jiang (G1, Mol. Biol.; co-advised w/ Yibin Kang)

#### *Former*

- Daniel Lee, PhD (QCB 2015-2021; co-advised w/ Ned Wingreen; NSF Fellow)
- Nicole Taylor, PhD (CBE 2013-2019; NSF Fellow; Currently Research Investigator, Bristol Myers Squibb)
- Lian Zhu, PhD (2013-2019; NSF Fellow; Currently Senior Engineer, Becton Dickinson)
- Marina Feric, PhD (2011-2016; Currently Postdoctoral Fellow, National Institutes of Health)
- Victoria Drake, MSE (2017-2018; Currently Research Scientist, Alexion Pharmaceuticals)

#### *Former Visiting Students*

- Wanliang Shan, PhD (2012, MAE; Currently Assistant Professor, University of Nevada, Reno)
- Zi Chen, PhD (2011-2012, MAE; Currently Assistant Professor, Dartmouth College)

### ***Postdoctoral Fellows***

#### *Current*

- Anita Donlic
- Sofi Quinodoz (HHMI Hannah Gray Fellow)
- David Sanders
- Felix Keber (EMBO Fellow, joint with Prof. Wühr)
- Amal Narayanan (LSRF Fellow)
- Jing Xia
- Amy Strom (LSRF/Mark Foundation Fellow)
- Lindsay Becker (Helen Hay Whitney Fellow)
- Shunsuke Shimobayashi (JSPS postdoctoral scientist)

#### *Former*

- Dan Bracha, HFSP Cross-Disciplinary Postdoctoral Fellow 2017-2021; Currently Assistant Professor, Technion University
- Joshua Riback, Postdoctoral Fellow 2018-2021; Currently Assistant Professor, Baylor College of Medicine
- Jorine Eeftens, Rubicon Postdoctoral Fellow 2018-2021; Currently Assistant Professor, Radboud University
- Paul Ackerman, Postdoctoral Fellow 2017-2020; Currently Scientist at Nereid Therapeutics
- Chanelle Jumper, Postdoctoral Fellow 2018-2020; Currently Scientist at Nereid Therapeutics
- Steven Ming-Tzo Wei, Postdoctoral Fellow 2014-2020; Currently Research Scientist, BMS/Celgene
- Yongdae Shin, Postdoctoral Fellow 2014-2018; Currently Assistant Professor, Seoul National University
- Stephanie Weber, Damon Runyon Postdoctoral Fellow 2011-2015; Currently Assistant Professor, McGill University
- Shana Elbaum-Garfinkle, K99 Postdoctoral Fellow 2012-2017; Currently Assistant Professor, CUNY Advanced Science Research Center
- Sravanti Uppaluri, 2012-2015; Currently Assistant Professor, Azim Premji University
- Huaiying Zhang, Visiting Postdoctoral Fellow 2015; Currently Assistant Professor, Carnegie Mellon University
- Nilesh Vaidya, Helen Hay Whitney Fellow, 2013-2016; Currently Senior Scientist, GSK

PROFESSIONAL  
AFFILIATIONS

American Society of Cell Biology (ASCB)  
American Institute of Chemical Engineers (AIChE)  
American Physical Society (APS)  
Genetics Society of America (GSA)  
Biophysical Society (BPS)

PRINCETON  
SERVICE

(only major University service listed; non-exhaustive list)

- Director, Princeton Bioengineering Initiative, 2020-
- Princeton Biomolecular Condensate Initiative, Founder, 2020-
- BioE Colloquium Founder and Organizer, AY13-14, AY14-15, AY15-16, AY16-17
- Founder, Rising Stars in BioE Seminar Series, 2020-
- Molecular Biology Junior Faculty Search Committee, AY14-15
- Committee on the Course of Study, AY14-15
- Co-chair, BioE Faculty Search Committee, AY17-18, AY18-19, AY20-21
- BioE Building Committee, AY20-21
- CBE Junior Faculty Search Committee, AY18-19
- Bioengineering Working Group, S17
- Institutional Biosafety Committee, AY17-18, AY18-19
- CBE Safety Committee, AY18-19
- SEAS New Engineering Complex Buildings Committee, AY17-18
- Freshman Advisor (Forbes), AY14-15, AY15-16, AY16-17, AY17-18, AY18-19

EDITORIAL

BOARDS *Physical Review Applied, Scientific Reports (2017-2019)*

MANUSCRIPT

REVIEWS *Science, eLife, Nature, Nature Chemistry, Nature Materials, Nature Physics, Nature Cell Biology, Nature Genetics, Cell, Developmental Cell, Molecular Cell, Proceedings of the National Academy of Sciences, USA (PNAS), Current Opinion in Cell Biology, Trends in Biochemical Sciences, Trends in Cell Biology, European Molecular Biology Organization (EMBO) Journal, Development, Current Biology, Biophysical Journal, Molecular Biology of the Cell, Journal of the Royal Society Interface, Journal of Colloids and Interface Science, Physical Review Letters, others.*

## GRANT

REVIEWS Human Frontiers Science Program Grant Committee 2017, 2018, 2019, 2020; National Science Foundation (Physics of Living Systems Panel 2014,2015; Materials World Network proposal 2012); Air Force Office of Scientific Research (Young Investigator Program proposal 2012); Swiss National Science Foundation 2014; Wellcome Trust 2016

## INVITED TALKS

### 2021

- 171 MURI Program Review Meeting, virtual talk on “Uncovering and applying the interfacial design principles of multiphase natural and synthetic organelles”, Dec 8, 2021
- 170 Keystone Symposium on Higher Order Chromatin Architecture, “Nucleolar viscoelasticity and ribosome biogenesis”, Oct 17, 2021
- 169 Rutgers University, Distinguished Speakers graduate student-run seminar series (virtual), “A Liquid paradigm for biological organization”, Nov 8, 2021
- 168 EpBioE Meeting (virtual), “Intracellular condensates: rheology and biological function”, Nov 4, 2021
- 167 CSHL Transcription Meeting (virtual), “rRNA dynamics in the nucleolus”, Sept 3, 2021
- 166 MBL Friday Evening Lecture Series, “A liquid paradigm for biological organization”, July 9, 2021
- 165 Oxford University “Physics Meets Biology” (virtual), Keynote talk on “Physics of Intracellular Phase Transitions”, July 26, 2021
- 164 HFSP Nakasone Award Ceremony Talk, July 5, 2021
- 163 UCSF Protein Homeostasis Mini-Course, May 19, 2021
- 162 Brazilian Biophysical Society, 20 IUPAB Congress (virtual), “Forward and reverse engineering states of matter in living cells”, May 26, 2021
- 161 Rockefeller JCB/JEM Symposium on “Neurodegenerative Diseases: Emerging mechanisms and Therapeutic opportunities” (virtual); talk title: “Mapping reversible and irreversible phase transitions in living cells”, April 26, 2021
- 160 NIH RNA Biology Symposium (virtual), “Mapping protein/rna phase separation in living cells”, April 15, 2021
- 159 Wiley Prize Symposium (virtual), “Intracellular phase separation: Physics of living matter”, April 9, 2021
- 158 UCLA Molecular Biology Institute Seminar (virtual), “Fluid forces - phase separation in, on, and around the genome”, April 8, 2021
- 157 American Physical Society, 2021 Annual Meeting (virtual), Session on Non-Linear Dynamics in Cell Mechanobiology, “Anomalous Liquids: Phase separation in, on, and around the genome” March 15, 2021
- 156 Japan, Riken BDR Symposium on Structuring Biosystems (virtual), “Nucleation landscape of biomolecular condensates”, March 1, 2021
- 155 Yale University, Department of Biomedical Engineering Seminar (virtual), “Forward and reverse engineering states of matter in living cells”, Jan 26, 2021
- 154 Vienna, Austria, Joint seminar of IMP, IMBA and Max Perutz labs (virtual), “Forward and reverse engineering states of matter in living cells”, Jan 21, 2021

### 2020

- 153 American Society of Cell Biology annual meeting (virtual), “Fluid forces: Mechanics of Intracellular Phase Separation”, Dec 8, 2020
- 152 University of Oregon, Institute of Molecular Biology (virtual), “Liquid phase condensation in cell physiology and disease”, Nov 17, 2020
- 151 KNAW Dutch Biophysics Meeting (virtual), “Nucleation landscape of biomolecular condensates”, Nov 10, 2020
- 150 Princeton University ENGAGE Virtual Symposium (virtual), “Covid19: Targeting its Fatty Underbelly”, Nov 6, 2020
- 149 Georgetown-Lombardi Oncology Grand Rounds/Visiting Professor (virtual), “Liquid phase condensation in cell physiology and disease”, October 16, 2020

- 148 International Titisee Conference on Genome folding: physics and function (virtual), “Telomeric condensates”, October 15, 2020
- 147 New York Genome Center, Covid19 Discussion Group (virtual), “Adventures in Spike-ACE2 mediated membrane fusion: Sex hormones, drugs, and high throughput rock ’n roll”, Sept 14, 2020
- 146 NIH FusOnC2 Annual Meeting, (Reverse) Engineering Liquid States of Intracellular Matter (virtual), Sept 10, 2020
- 145 National Academy of Sciences, Decadal Review in Biological Physics (virtual), “Liquid intracellular condensates: Self-assembly of bimolecular matter”
- 144 New York Academy of Sciences, Symposium on CRISPR, “Liquid nuclear condensates: in, on, and around the genome”, NYC, February 24, 2020
- 143 Biophysical Society Annual Meeting, San Diego CA, February 16, 2020, “Encoding multiphase cytoplasmic structure” (Symposium on “Fuzzy Interactions and Crowding”)

## 2019

- 142 NIH 4D Nucleome Annual Meeting, Washington, DC, December 6, 2019, “The Liquid Nucleome”
- 141 UT Southwestern Medical Center, Symposium on Neurodegeneration, Dallas, TX, October 24, 2019, “A Fluid View of Cytoplasmic Stress”
- 140 University of Virginia, Distinguished Guest Lecturer in Integrative Biosciences Course, Charlottesville, VA, October 2, 2019, “Liquid Organelles: Moving through intracellular phase space “
- 139 Albert Einstein College of Medicine, Departmental of Cell Biology Seminar Series, New York, NY, September 9, 2019, “Liquid Organelles: Moving through intracellular phase space”
- 138 “Soft Matter” Gordon Conference, New London, NH, August 12-16, 2019, “Nucleating Liquid Phase Organelles”
- 137 Marine Biological Laboratory, Physiology Course, Woods Hole, MA, July 24, 2019, “Self-assembly of intracellular matter”
- 136 “Proteins” Gordon Conference, Holderness, NH, June 17-21, 2019, “Mechanics of nucleating functional protein condensates”
- 135 Harvard University, Molecular Biology Department Seminar, May 20, 2019, “Reverse-engineering intracellular phase space”
- 134 National Cancer Institute, workshop on Phase Separation and Cancer, NIH Campus, May 14-15, 2019, “Mechano-active liquid condensates and the genome”
- 133 Keystone Conference on Biomolecular Condensates, Snowbird UT, April 10-14, 2019, Keynote Lecture, “Moving through Intracellular Phase Space”
- 132 Vaughan Lecture, California Institute of Technology, Department of Chemical Engineering, Pasadena CA, March 15, 2019, “Controlling intracellular phase transitions with light”
- 131 American Physical Society (APS) March Meeting, Kavli Lecture, Boston, MA, March 6, 2019 “Intracellular liquid condensates: Understanding and controlling biomolecular phase transitions in living cells”
- 130 New York Academy of Science Conference on Phase Separation, New York, NY, February 20, 2019, “Interaction nodes in phase separation”
- 129 University of Puerto Rico, Rio Piedras, RISE/MARC Program Seminar, San Juan Puerto Rico, February 15, 2019, “Lighting up intracellular phase space”
- 128 2019 World Economic Forum, Davos Switzerland, “Bioengineered Intracellular Condensates”
- 127 Rice University, Center for Theoretical Biological Physics, Houston, TX, “Lighting up intracellular phase space”
- 126 BMES 2019 Cellular and Molecular Bioengineering Conference, San Diego, CA, January 4, 2019, “Mechanics of intracellular phase separation”

## 2018

- 125 Banbury Center conference on Phase Separated Assemblies in Cell Biology, Cold Spring Harbor Laboratory, NY, December 16-19, 2018, “Mechanics of phase separation”
- 124 NIH 4D Nucleome Annual Meeting, San Diego, CA, December 5, 2019, “Mechano-active liquid nuclear condensates”
- 123 Conference: “RNA at the bench and bedside”, La Jolla, CA, October 8-10, 2018, “Lighting up intracellular phase space”
- 122 3rd International Meeting of the French Society for Cell Biology - Building the Cell, Paris, France, September 26-28 2018, “Lighting up intracellular phase space”



- 121 11th International Conference on Ribosome Synthesis, Orford, Quebec, Canada, August 1, 2018, “Lighting up the nucleolus”
- 120 iBiology Seminar 3 (recorded at Lasker Foundation, New York, NY, July 25, 2018), “Using light to study and control intracellular phase behavior”
- 119 iBiology Seminar 2 (recorded at Lasker Foundation, New York, NY, July 25, 2018), “Multiphase liquid behavior of the nucleolus”
- 118 iBiology Seminar 1 (recorded at Lasker Foundation, New York, NY, July 25, 2018), “Liquid Phase Condensation in Living Cells”
- 117 World Biomechanics Congress, Dublin, Ireland, July 10, 2018, “RNA protein liquids: lighting up intracellular phase space”
- 116 Memorial Sloan Kettering Cancer Center, Department of Cell Biology seminar, New York, NY, June 21, 2018, “RNA protein liquids: lighting up intracellular phase space”
- 115 Marine Biology Laboratory, Physiology Course Lecturer, Woods Hole, MA, June 16, 2018, “Self-assembly of Intracellular Matter”
- 114 NIH High-Risk High Reward Symposium, Bethesda MD, June 6-8, 2018, “The Liquid Nucleolus”
- 113 EMBO Meeting, Heidelberg, Germany: Cellular Mechanisms Driven by Liquid Phase Separation, May 13, 2018 . Seminar at pre-meeting summit, “Liquid-liquid phase separation in intracellular organization”.
- 112 New York University, Department of Biology Seminar, April 23, 2018, “Moving through intracellular phase space”
- 111 Cell Press Webinar on Liquid-liquid phase separation, March. 15, 2018 “RNA/protein liquids: lighting up intracellular phase space”
- 110 Lehigh University, HHMI Visiting Scholar Seminar, Feb. 15, 2018 “RNA/protein liquids: lighting up intracellular phase space”
- 109 Columbia University, Biological Sciences seminar, Feb. 7, 2018 “RNA/protein liquids: lighting up intracellular phase space”
- 108 University of California, Berkeley, Marian E. Koshland student-invited seminar, January 23, 2018, “RNA/protein liquids: lighting up intracellular phase space”

## 2017

- 107 Princeton Center for Theoretical Science, Conference on Transitions in Biology, Princeton, NJ December 15, 2017. “Moving through intracellular phase space”
- 106 ASCB Annual Meeting, Philadelphia, PA, December 2, 2017. “Lighting up nucleoplasmic phase space”
- 105 Institute for Advanced Study, Princeton, NJ, November 15, 2017. “Fluid states of intracellular matter”
- 104 27th Solvay Conference on “The physics of living matter: Space, time and information in biology”, Brussels, Belgium, October 19, 2017. Rapporteur talk on “Self-assembly of Intracellular Matter”
- 103 ASBMB Special Symposium on “Emerging Roles for the Nucleolus”, Stowers Institute for Medical Research, Kansas City, Missouri, Oct. 26-29, 2017, “Liquids, gels, and everything in between: Moving through nucleolar phase space”.
- 102 Johns Hopkins Department of Biological Chemistry, Keynote speaker at Annual Retreat, September 15, 2017, “Moving Through Intracellular Phase Space”
- 101 Telluride Science Research Center Workshop on Intrinsically Disordered Proteins, Telluride, Colorado, July 10-15, 2017, “Moving Through Intracellular Phase Space”
- 100 FASEB Conference on Protein Aggregation in Health and Disease, Steamboat Springs, Colorado, June 11-16, 2017, “Moving Through Intracellular Phase Space”
- 99 University of California, San Francisco, Biochemistry and Biophysics Departmental Seminar Series, May 23, 2017, “Moving Through Intracellular Phase Space”
- 98 Rockefeller University, Seminar at the Center for the Studies in Physics and Biology, May 25, 2017, “Moving Through Intracellular Phase Space”
- 97 California Institute of Technology, Biochemistry and Molecular Biophysics Seminar series, May 11, 2017, “Moving Through Intracellular Phase Space”
- 96 Symposium on “Intracellular Phase Transitions and Macromolecular Assemblies”, VIB Vesalius Research Center, Leuven, Belgium, May 2-5, 2017, “Moving Through Intracellular Phase Space”
- 95 University of Pennsylvania, Department of Biochemistry and Biophysics, April 25, 2017, “Moving Through Intracellular Phase Space”
- 94 Symposium on “Aqueous Cytomimetic Materials”, Materials Research Society (MRS) Spring Meeting, Phoenix, Arizona, April 17-21, 2017, “Moving Through Intracellular Phase Space”
- 93 American Chemical Society (ACS) Annual Meeting, Symposium on “Coacervation physics, chemistry, and biology”, San Francisco, April 2-6, 2017, “Moving Through Intracellular Phase Space”

- 92 New England Biolabs, Company Seminar Series, Ipswich, MA, March 16, 2017, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 91 Massachusetts Institute of Technology, Department of Chemical and Biological Engineering Seminar, March 24, 2017, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 90 Harvard Medical School, Department of Biological Chemistry and Molecular Pharmacology seminar, Feb. 2, 2017, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 89 Distinguished Lecturer in Cell Biology Seminar Series, Cell and Physiology Center of the NIH (NHLBI), Jan. 5, 2017, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”

## 2016

- 88 Symposium at Max Planck Institute for Biochemistry, Martinsreid/Munich, Germany, November 28, 2016, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 87 University of Massachusetts Medical School, Department of Biochemistry and Molecular Pharmacology seminar, November 16, 2016, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 86 Symposium at Department of Molecular Life Sciences, University of Zurich, Switzerland, November 7-8, 2016, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 85 Seminar at Max Delbrueck Center for Molecular Medicine, Berlin, Germany, October 31, 2016, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 84 Seminar at the Scientific Symposium in honor of the 15th anniversary of the Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany, October 27-29, 2016, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 83 Distinguished Guest Seminar Series, Max Planck Institute of Molecular Physiology, Dortmund, Germany, Nov. 3, 2016. “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 82 Harvard University, Department of Systems Biology, “Theory Lunch” talk, October 21, 2015. “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 81 Plenary talk at Annual Dutch Biophysics Meeting, Veldhoven, The Netherlands, October 3-4, 2016. “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 80 School of Chemical & Biomolecular Engineering Seminar, Georgia Tech, Atlanta, GA, Sept. 21, 2016. “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 79 Heraeus Seminar on Cellular Dynamics, Bad Honnef, Germany, Sept. 4-7, 2016. “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 78 EMBL Symposium on Actin, Heidelberg, Germany, Sept. 7-10, 2016. “Nuclear Actin, Gravity, and RNA/Protein Droplets”
- 77 American Chemical Society (ACS) Annual Meeting, Symposium on “Intrinsically Disordered Proteins: Structure, Function, and Interactions”, Philadelphia, PA August 21-25, 2016. “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 76 30th Annual Symposium of The Protein Society, July 16-19, 2016, Baltimore, MD. “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 75 MIT, Department of Physics, Biophysics Seminar, May 11, 2016. “Measuring the Intracellular Dew Point”
- 74 Cornell University, Department of Chemical and Biomolecular Engineering Seminar, April 25, 2015, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 73 Meeting on “The Physical Basis of Cellular Adaptation and Memory”, McGill research institute, Barbados, April 15-22, 2015. “Measuring the Intracellular Dew Point”
- 72 University of Wyoming, Department of Molecular Biology Seminar, April 1, 2015, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 71 University of Chicago, Department of Molecular Genetics and Cell Biology, Student-Invited Seminar Series, March 17, 2015, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 70 Carnegie Mellon University, Department of Biomedical Engineering Seminar, Feb. 23, 2016, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 69 Instituto Gulbenkian de Ciencia, Institute Seminar, Oeiras, Portugal, Feb. 12, 2016, “Measuring the Intracellular Dew Point: The physics and Biology of Membraneless Organelles”
- 68 16th Mid-Atlantic Soft Matter Workshop, held at National Institutes of Health, Jan. 29, 2016, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 67 Symposium organized by Japanese Society for Quantitative Biology, National Institute of Genetics, Mishima, Japan, Jan. 13, 2016. “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 66 Symposium organized by Japanese Society for Quantitative Biology, University of Tokyo, Japan, Jan. 10, 2016. “Measuring the Intracellular Dew Point: Phase Transitions in Cells”

## 2015

- 65 University of Montreal, Canada, Department of Biochemistry Seminar, December 7, 2015, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 64 Stanford University, Center for Systems Biology Symposium on Quantitative Biology, December 4, 2015, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 63 Alzforum webinar: Fluid Business: Could “Liquid” Protein Herald Neurodegeneration?, October 30, 2015, “Intracellular Phase Transitions: From Organelle Function to Disease”. <http://www.alzforum.org/webinars/fluid-business-could-liquid-protein-herald-neurodegeneration>
- 62 National University of Singapore, Department of Biological Sciences (Departmental Seminar + 2 Lectures), November 2-5, 2015, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 61 University of Chicago, International Symposium on Multivalent Interactions in Polyelectrolytes: New Physics, Biology and Materials, October 2-4, 2015, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 60 BIOMS-EMBL, Physics of Cells and Tissues, Sept 30-Oct 2, 2015, Heidelberg, Germany, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 59 Departmental Seminar, University of Toronto/Hospital for Sick Children, Toronto, Canada, October 26, 2015, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 58 Center for Biological Systems Engineering, Washington University in St. Louis, October 20, 2015, “Intracellular Phase Transitions: The Physics and Biology of Membrane-less Organelles”
- 57 New York University, Department of Physics Colloquium, September 17, 2105, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 56 UMass Amherst, Joint Seminar: Departments of Chemical Engineering and Physics, September 8, 2015, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 55 Department of Biomedical Engineering, University of Texas Austin, September 3, 2015, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 54 CECAM Workshop on Intrinsically Disordered Proteins, August 18-21, 2015, Zurich, Switzerland, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 53 NSF International Physics of Living Systems (iPoLS) meeting, July 21, 2015, Arlington, VA, “Measuring the Intracellular Dew Point: Phase Transitions in Cells”
- 52 Gordon Research Conference on Developmental Biology, Mount Holyoke College, South Hadley MA, June 21-26, 2015, “Developmental Size Regulation, Drop by Drop”
- 51 EMBO Workshop on “Macromolecular Assemblies at the Crossroads of Stress and Function”, May 31-June 4, 2015, Jerusalem, “Cell Size Dependent RNA/Protein Phase Transitions”
- 50 Rutgers University, Department of Biomedical Engineering Seminar, April 6, 2015, “Intracellular Phase Transitions and Cell Growth Control”
- 49 Searle Scholars Program, Annual Meeting, Chicago IL, April 13-15, 2015, “RNA/Protein Phase Transitions and Cell Size”
- 48 Engineering and Physical Biology Symposium, Harvard University, April 25, 2015 “Cell Size Dependent RNA/Protein Phase Transitions”
- 47 University of California, San Diego, Division of Biological Sciences and CMM Seminar, March 18, 2015. “RNA/Protein Phase Transitions and Cell Size”
- 46 Cold Spring Harbor, Meeting on “Cellular Dynamics and Models”, March 3-5, 2015. “RNA/Protein Phase Transitions and Cell Size”
- 45 Penn State, Department of Chemistry Seminar, Feb. 17, 2015, “Intracellular Phase Transitions and Cell Size”
- 44 9<sup>th</sup> Annual Intrinsically Disordered Proteins Subgroup Symposium, Biophysical Society Annual Meeting, February 7, 2015, Baltimore, MD, “Space and Time in Intracellular IDP-mediated phase transitions”.
- 43 Danny Thomas Lecture, St. Jude Children’s Research Hospital, Memphis TN, January 30, 2015, “Intracellular Phase Transitions and Cell Size”
- 42 Georgetown University, Department of Physics Colloquium, Jan. 20, 2015, “RNA/Protein Phase Transitions and Cell Size”

## 2014

- 41 American Society for Cell Biology Annual Meeting, Special Interest Subgroup - Building the Cell, “*Intracellular Phase Transitions and Cell Size*”, Philadelphia, December 2014,
- 40 MBL REU Program, Invite a Scientist Lecture Series, “*Do what you love (and if it’s fishing...use a big hook)*”, Woods Hole MA, July 15, 2014
- 39 Cytoskeleton and Cell Division seminar series at the Marine Biological Lab, Woods Hole, MA, July 1, 2014, “RNA/Protein Phase Transitions and Cell Size”

- 38 15<sup>th</sup> International Xenopus Conference, Pacific Grove, CA, August 2014. “Intracellular RNP Droplets: Cell Size, Nuclear Actin, and Gravity”
- 37 Imperial College, London, UK, Departmental of Bioengineering Colloquium, October 2014. “RNA/Protein Phase Transitions and Cell Size”
- 36 Physics of Living Matter Symposium (PLM9), Cambridge, UK, September 2014. “RNA/Protein Phase Transitions and Cell Size”
- 35 7<sup>th</sup> World Congress of Biomechanics, Boston, MA July 2014. “Mechanics of Intracellular RNA/Protein Emulsions”
- 34 Gordon Research Conference on Intrinsically Disordered Proteins, Stonehill College, Easton MA, July 2014. “Phase Transitions of Intracellular RNA/Protein Bodies”
- 33 University of California-San Francisco, CCB/iPQB Seminar Series, May, 2014. “Intracellular Phase Transitions and Cell Size”
- 32 Annual Meeting of the American Physical Society, Focus Session on “Phase Transitions and Criticality in Cells”, March 2014. “Finite Size Effects in Intracellular Phase Transitions”
- 31 University of Pennsylvania, Departmental Seminar, Chemical and Biomolecular Engineering, March 2014. “Intracellular Phase Transitions, Nuclear Actin, and Gravity”
- 30 Stanford University, Frontiers in Quantitative Biology Seminar Series, January, 2014. “Intracellular Phase Transitions, Nuclear Actin, and Gravity”

## 2013

- 29 Northeast Complex Fluids and Soft Matter Workshop, Rutgers University, October 25, 2013. “RNA/Protein Droplets, Nuclear Actin, and Gravity”.
- 28 University of Illinois, Urbana-Champaign, Meeting on RNA, Cells and Gravity, October 19, 2013. “Intracellular Phase Transitions, Nuclear Actin, Gravity”.
- 27 University of Goettingen, Germany, Physics of the Embryo Meeting, September 29, 2013. “Intracellular Phase Transitions, Nuclear Actin, and Gravity”
- 26 Dartmouth University, Biochemistry Department Seminar, September 2013. “Nuclear Actin, RNA Droplets, and Gravity”
- 25 Gordon Research Conference on Soft Matter, Colby-Sawyer College, NH, August 2013. “Cytoplasmic Phase Transitions, Gravity, and Cell Size”
- 24 University of Connecticut Health Center, Department of Cell Analysis and Modeling, April 11, 2013, “RNA Droplets, Big Cells, and Gravity”
- 23 DARPA-DSRC Synthetic Organelle Workshop, Arlington VA, April 4, 2013, “Organelle Engineering: Scaffolds, drops, and cytoplasmic phase transitions”.
- 22 Annual Meeting of the American Physical Society, March 2013, “Nonequilibrium stabilization of an RNA/protein droplet emulsion by nuclear actin”.
- 21 Annual Meeting of the Biophysical Society, February 2013, “Gravitational stabilization of an RNA/protein emulsion by nuclear actin”
- 20 Princeton Origin of Life (POoL) Meeting, January 22 2013. “Active RNA droplets: Intracellular and Protocellular Assembly”

## 2012

- 19 Annual Meeting of the American Society of Cell Biology, December 2012, “Assembling liquid droplets of RNA and protein”
- 18 Department of Chemical and Biomolecular Engineering, University of Tennessee-Knoxville, September 4 2012, “Liquid phase RNA/protein droplets in growing cells”
- 17 Defense Science Research Council (DSRC) Meeting, Santa Cruz, August 27, 2012, “Organism Self-Assembly, Drop by drop”.
- 16 International conference on molecular crowding, Monte Verita, Switzerland, June 2012, “Liquid RNA/protein droplets in growing cells”
- 15 Queens College Biology Department Colloquium, May 2012, “Building an embryo, drop by drop”
- 14 McGill University, Molecular Seminar Series, Montreal, Canada, January 2012 “Building an embryo, drop by drop”

## 2011

- 13 University of Chicago, Institute for Biophysical Dynamics, November 2011 “Building an embryo, drop by drop”
- 12 Johns Hopkins University, Department of Molecular Biology & Genetics, November 2011 “Building an embryo, drop by drop”
- 11 University of Illinois – Urbana Champaign, Center for Physics of Living Cells, November 2011 “Building an embryo, drop by drop”

- 10 Harvard University, Conference on Soft Matter & Innovation, “Building an embryo, drop by drop”, October 9, 2011
- 9 Princeton University, Developmental Colloquium, “Building an embryo, drop by drop”, April 22, 2011

**Pre-2011**

- 8 AMOLF Institute Colloquium, “Phase Transitions and Cytoplasmic Self-Assembly”, Amsterdam, The Netherlands, June 2010
- 7 German Physical Society, Symposium on 'Slow Anomalous Transport in Heterogeneous Media: From porous materials to cellular crowding', “Phase Transitions, liquid micro-compartments, and embryonic patterning”, Regensburg, Germany, March 2010.
- 6 California Institute of Technology, “Phase Transitions and Cytoplasmic Self-Assembly”, March 2010
- 5 Cornell University, “Phase Transitions and Cytoplasmic Self-Assembly”, February 2010
- 4 New England Biolabs Inc., “Phase Transitions and Cytoplasmic Self-Assembly”, Ipswich, MA, January 2010
- 3 Princeton University, “Phase Transitions and Self-Assembly in the Cytoplasm of Living Cells”, January 2010
- 2 Yale University, Physical & Engineering Biology Colloquium, “Liquid-Liquid Phase Transitions and the Self-Assembly of Cytoplasmic Microcompartments”, November, 2009
- 1 American Physical Society, Annual Meeting, Symposium on Complex and Active Biomaterials: Mechanics and Microrheology, “Microtubule Bending Fluctuations and Structural Reinforcement in Cells”, New Orleans, LA, March 2008