

# KERWYN CASEY HUANG, Ph. D.

DEPARTMENT OF BIOENGINEERING, STANFORD UNIVERSITY

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## EDUCATION

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<b>Massachusetts Institute of Technology (GPA: 4.9/5.0)</b> Ph.D. in Physics. <i>Thesis:</i> Polaritonic Photonic Crystals, Melting, and Min-Protein Oscillations.	1999–2004
<b>University of Cambridge</b> M.Phil. in Physics. <i>Thesis:</i> <i>Ab initio</i> Determination of Energetics and Forces in Molecules.	1998–1999
<b>California Institute of Technology (GPA: 4.0/4.0)</b> B.S. with Honors in Physics and Mathematics.	1994–1998

## EMPLOYMENT AND RESEARCH EXPERIENCE

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<b>Stanford University, Biophysics Program, Stanford, CA</b> <i>Director.</i>	2015 – present
<b>Stanford University, Department of Microbiology and Immunology, Stanford, CA</b> <i>Associate Professor of Microbiology and Immunology.</i>	2014 – present
<b>Stanford University, Department of Bioengineering, Stanford, CA</b> <i>Associate Professor of Bioengineering, with courtesy appointments in Biochemistry.</i>	2014 – present
<b>Stanford University, Department of Microbiology and Immunology, Stanford, CA</b> <i>Assistant Professor of Microbiology and Immunology.</i>	2011 – 2014
<b>Stanford University, Department of Bioengineering, Stanford, CA</b> <i>Assistant Professor of Bioengineering, with courtesy appointments in Biochemistry and Electrical Engineering.</i>	2008 – 2014
<b>Princeton University, Department of Molecular Biology, Princeton, NJ</b> <i>Visiting Research Fellow and Associate Research Scholar, Laboratory of Professor Ned Wingreen.</i>	2004 – 2008
<ul style="list-style-type: none"><li>• Research into the biophysics of cell-shape detection, including polymer formation, lipid localization, and cell-wall synthesis.</li><li>• Awarded a National Institutes of Health K25 Mentored Quantitative Research Career Development Award, \$625,000 direct costs 2005-2010, to develop a molecular model of Min-protein polymer formation in <i>E. coli</i>.</li></ul>	
<b>Massachusetts Institute of Technology, Department of Physics, Cambridge, MA</b> <i>Graduate student, Laboratory of Professor John Joannopoulos.</i>	1999 – 2004
<ul style="list-style-type: none"><li>• Theoretical and computational studies of field expulsion and reconfiguration phenomena in polaritonic photonic crystals, metamaterials as optical-frequency magnetic sources, and characterization of Bloch states in the presence of dielectric losses.</li><li>• Density Functional Theory analysis of surface melting in semiconductors, including superheating and induced melting.</li></ul>	
<b>NEC Laboratories, America, Princeton, NJ</b> <i>Intern, Biophysics research group of Dr. Ned Wingreen and Dr. Chao Tang.</i>	2002 – 2004
<ul style="list-style-type: none"><li>• Research into Min-protein oscillations. This work contributed substantially to Wingreen NIH R01 grant at Princeton.</li></ul>	
<b>University of Cambridge, Department of Physics, Cambridge, United Kingdom</b> <i>M. Phil. student, Laboratory of Dr. Gunaretnam Rajagopal.</i>	1998 – 1999
<ul style="list-style-type: none"><li>• Research into all-electron Quantum Monte Carlo calculations of hydrogen-bond energies in water-dimer clusters.</li></ul>	

## FELLOWSHIPS AND AWARDS

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2<sup>nd</sup> place, Nikon Small World Photomicrography Competition, 2015.

**Friedrich Wilhelm Bessel Award**, *Humboldt Foundation* (2014-2015).  
**NSF Early CAREER Award**, (2012-2017).  
**Hellman Foundation Faculty Scholars Award**, (2010-2011).  
**NIH Director's New Innovator Award**, (2009-2014).  
**Frederick E. Terman Fellowship**, (2008-2011).  
**NIH K25 Quantitative Research Career Development Award**, (2005-2010).  
**Helen Hay Whitney Fellowship**, (2005-2008).  
**Pan-American Studies Institute Fellowship**, Meeting on Nano- and Biotechnology, Bariloche, Argentina. (2006).  
**Cold Spring Harbor Fellowship**, Advanced Bacterial Genetics course (2004).  
**NSF Graduate Research Fellowship** (1999-2002).  
**MIT Robert Stockbarger Graduate Research Fellowship** (1999-2001).  
**Churchill Scholarship**, University of Cambridge (1998-1999).  
**Goldwater Academic Scholarship** (1996-1998).  
**Caltech Academic Merit Scholarship** (1996-1998).  
**H. J. Ryser Scholarship**, California Institute of Technology, Mathematics Department Top Undergraduate (1996-1997).

## PUBLICATIONS

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All students and postdocs in Huang lab are underlined below.

- JM Peters\*, A Colavin\*, H Shi\*, TL Czarny, MH Larson, S Wong, JS Hawkins, CHS Lu, B-M Koo, E Marta, AL Shiver, EH Whitehead, JS Weissman, ED Brown, LS Qi†, KC Huang†, CA Gross†, “A Comprehensive, CRISPR-based Approach to Functional Analysis of Essential Genes in Bacteria,” *Cell* **165** 1-14 (2016).  
 \*co-first authors.  
 †co-corresponding authors.
- G Auer, TK Lee, M Ranjendram, S Cesar, A Miguel, **KC Huang**†, D Weibelt, “Mechanical genomics: identification of regulators of bacterial cell stiffness,” *Cell Systems* **2** 1-10 (2016).
- H Sutterlin\*, H Shi\*, A Miguel, S Khare, **KC Huang**†, TJ Silhavy† “Disruptions to bacterial outer membrane synthesis cause mechanical destabilization during cytokinesis,” *PNAS* **113** E1565-E1574 (2016).  
 \*co-first authors.  
 †co-corresponding authors
- SM Desmarais, C Tropini, A Miguel, RD Monds, F Cava, MA de Pedro, **KC Huang**, “High-throughput, highly sensitive analyses of bacterial cell walls using Ultra-Performance Liquid Chromatography,” *J Biol Chem* **290** 31090-31100 (2015).
- JS Lichtman, E Alsentzer, M Jaffe, D Sprockett, E Masutani, E Ikwa, GK Fragiadakis, D Clifford, BE Huang, JL Sonnenburg†, **KC Huang**†, JE Elias†, “The effect of microbial colonization on the host proteome varies by gastrointestinal location”, *ISME J* 1-12 (2015).  
 †co-corresponding authors.
- D Ando, N Korabel, **KC Huang**†, A Gopinathan†, “Design principles for optimal intracellular transport along cytoskeletal networks,” *Biophys J* **109** 1574-1582 (2015).  
 †co-corresponding authors.
- KA Earle\*, G Billings\*, M Sigal, J Lichtman, J Elias, MR Amieva, **KC Huang**†, JL Sonnenburg†, “Quantitative Imaging of Gut Microbiota Spatial Organization”, *Cell Host & Microbe* **18** 478-488 (2015).  
 \*co-first authors.  
 †co-corresponding authors.
- KC Huang**, “Applications of imaging for bacterial systems biology,” *Curr Opin Microbiol* **27** 114-120 (2015).
- L Gelens, **KC Huang**, JE Ferrell, Jr., “How does the *Xenopus laevis* embryonic cell cycle avoid spatial chaos?,” *Cell Reports* **12** 892-900 (2015).
- KC Huang**, “Super symmetry in bacterial cell division,” *Nature Nanotechnology* **10** 655-656 (2015).

11. AN Gray, AJF Egan, IL van't Veer, J Verheul, A Colavin, A Koumoutsis, J Biboy, MAF Altelaar, MJ Damen, **KC Huang**, J-P Simorre, E Breukink, T den Blaauwen, A Typas, CA Gross, W Vollmer, "Coordination of peptidoglycan synthesis and outer membrane constriction during *Escherichia coli* cell division," *eLife* 10.7554/eLife.07118 (2015).
12. K Sundararajan, A Miguel, SM Desmarais, EL Meier, **KC Huang**, ED Goley, "The bacterial tubulin homolog FtsZ requires an intrinsically disordered membrane tether for directing robust cell wall construction", *Nat Comm* **6** 7281 (2015).
13. X Zhou\*, DK Halladin\*, ER Rojas\*, EF Koslover, TK Lee, **KC Huang**, JA Theriot, "Mechanical crack propagation drives millisecond daughter cell separation in *Staphylococcus aureus*", *Science* **348** 574-578 (2015).
14. RL Gill, Jr.\*, J-P Castaing\*, J Hsin\*, IS Tan, X Wang, **KC Huang**†, F Tian†, KS Ramamurthi†, "Structural and mechanistic basis for the geometric cue-driven subcellular localization of a bacterial protein", *PNAS* **112** E1908-E1915 (2015).  
\*co-first authors.  
†co-corresponding authors.
15. A Miguel, J Hsin, T Liu, G Tang, RB Altman, **KC Huang**, "Variations in the binding pocket of an inhibitor of the bacterial division protein FtsZ across genotypes and species", *PLoS Comp Biol* **11** e1004117 (2015).
16. RMW Chau, T Ursell, S Wang, **KC Huang**†, D Bhaya†, "Maintenance of motility bias during cyanobacterial phototaxis", *Biophys J* **108** 1623-1632 (2015).  
†co-corresponding authors.
17. Z Zhou, EL Munteanu, J He, T Ursell, M Bathe, **KC Huang**, F Chang, "The contractile ring coordinates curvature dependent septum assembly during fission yeast cytokinesis", *Mol Biol Cell* **26** 78-90 (2015).
18. C Tropini, TK Lee, J Hsin, SM Desmarais, T Ursell, RD Monds†, **KC Huang**†, "Principles of Bacterial Cell-Size Determination Revealed by Cell-Wall Synthesis Perturbations", *Cell Reports* **9** 1520-1527 (2014).  
†co-corresponding authors.
19. RD Monds, TK Lee, A Colavin, T Ursell, TF Cooper, **KC Huang**, "Systematic perturbation of cytoskeletal function reveals linear scaling relationships between cell geometry and fitness", *Cell Reports* **9** 1528-1537 (2014).
20. G Billings, N Ouzounov, T Ursell, SM Desmarais, J Shaevitz, Z Gitai†, **KC Huang**†, "De novo establishment of cell shape in bacterial L-forms through curvature-dependent localization of the MreB cytoskeleton", *Molec Microbiol* **93** 883-896 (2014).  
†co-corresponding authors.
21. F Chang†, **KC Huang**†, "How and why cells grow as rods", *BMC Biology* **12** 54-64 (2014).  
†co-corresponding authors.
22. ER Rojas, JA Theriot†, **KC Huang**†, "The response of *Escherichia coli* growth rate to osmotic shock", *PNAS* **111** 7807-7812 (2014).  
†co-corresponding authors.
23. A Colavin, J Hsin, **KC Huang**, "Effects of polymerization and nucleotide hydrolysis on the filament properties of the bacterial actin homolog MreB", *PNAS* **111** 3585-3590 (2014).
24. T Ursell, J Nguyen, RD Monds, A Colavin, G Billings, N Ouzounov, Z Gitai, J Shaevitz, **KC Huang**, "Rod-like bacterial shape is maintained by feedback between cell curvature and cytoskeletal localization", *PNAS* **111** E1025-1034 (2014).
25. TK Lee, C Tropini, J Hsin, SM Desmarais, T Ursell, E Gong, Z Gitai, RD Monds†, **KC Huang**†, "A dynamically assembled cell-wall synthesis machinery buffers cell growth", *PNAS* **111** 4554-4559 (2014).  
†co-corresponding authors.
26. S Desmarais, F Cava, M de Pedro, **KC Huang**, "Isolation and preparation of bacterial cell walls for Ultra-Performance Liquid Chromatography," *J Vis Exp* **83** e51183 (2014).
27. TK Lee, **KC Huang**, "The role of hydrolases in bacterial cell-wall growth", *Curr Opin Microbiol* **16** 760-766 (2013).
28. T Ursell\*, R Chau\*, S Wisen\*, D Bhaya†, **KC Huang**†, "Motility enhancement through surface modification is sufficient for cyanobacterial community organization during phototaxis", *PLoS Comp Biol* **9** e1003205 (2013).  
\* these authors contributed equally to this work.  
†co-corresponding authors.
29. J Hsin, R Fu, **KC Huang**, "Physiological role of FtsA polymerization during bacterial cell division", *J Mol Biol* **425** 4415-4426 (2013).

30. Y Li, J Hsin<sup>\*</sup>, L Zhao<sup>\*</sup>, Y Cheng<sup>\*</sup>, **KC Huang**, H-W Wang, S Ye, “Multiple conformations of FtsZ protofilaments provide structural insight into mechanisms of bacterial cytokinesis”, *Science* **341** 392-395 (2013).  
\* these authors contributed equally to this work.
31. S Desmarais, MA de Pedro, F Cava<sup>†</sup>, **KC Huang**<sup>†</sup>, “Peptidoglycan at its peaks: how chromatographic analyses can reveal bacterial cell wall structure and assembly”, *Mol Microbiol* **89** 1-13 (2013).  
† co-corresponding authors.
32. P Patel, O Shirihai, **KC Huang**, “Optimal dynamics for quality control in spatially distributed mitochondrial networks”, *PLoS Comp Biol* **9** e1003108 (2013).
33. DT Kysela, PJB Brown, **KC Huang**, YV Brun, “Biological Consequences and Advantages of Asymmetric Bacterial Growth”, *Ann Rev Microbiol* **67** 417-435 (2013).
34. K Tsekouras, I Goncharenko, ME Colvin, **KC Huang**<sup>†</sup>, A Gopinathan<sup>†</sup>, “Optimal Nanocarrier Design for Cancer Cell Targeting”, *PLoS One* **8** e65623 (2013).  
† co-corresponding authors
35. G Misra, ER Rojas, A Gopinathan, **KC Huang**, “Mechanical consequences of turnover in the elongation of a Gram-positive bacterium”, *Biophys J* **104** 2342-2352 (2013). *Commentary in Biophysical Journal*.
36. **KC Huang**<sup>†</sup>, D Ehrhardt, J Shaevitz<sup>†</sup>, “The molecular origins of chiral growth in walled cells”, *Curr Opin Microbiol* **15** 707-714 (2012).  
† co-corresponding authors.
37. TS Ursell<sup>\*</sup>, E Trepagnier<sup>\*</sup>, **KC Huang**<sup>†</sup>, JA Theriot<sup>†</sup>, “Analysis of surface protein expression reveals the growth pattern of the Gram-negative outer membrane”, *PLoS Comp Biol* **8** e1002680 (2012).  
\* these authors contributed equally to this work.  
† co-corresponding authors.
38. C Tropini, N Rabbani, **KC Huang**, “Physical constrains on the establishment of intracellular spatial gradients in bacteria”, *BMC Biophysics* **5:17** (2012). *Commentary in BMC Biophysics, 5:18*.
39. C Tropini, **KC Huang**, “Interplay between the localization and kinetics of phosphorylation in flagellar pole development of the bacterium *Caulobacter crescentus*”, *PLoS Comp Biol* **8** e1002602 (2012).
40. J Cueva, J Hsin, **KC Huang**, M Goodman, “Alpha Tubulin Acetylation Regulates Protofilament Number in Native Microtubules”, *Curr Biol* **22** 1066-1074 (2012).
41. J Hsin, A Gopinathan, **KC Huang**, “Nucleotide-dependent conformations of FtsZ dimers and force generation observed through molecular dynamics simulations”, *PNAS* **109** 9432-9437 (2012).
42. HH Tuson<sup>\*</sup>, GK Auer<sup>\*</sup>, LD Renner, M Hasebe, C Tropini, M Salick, WC Crone, A Gopinathan, **KC Huang**<sup>†</sup>, DB Weibelt<sup>†</sup>, “Measuring the stiffness of bacterial cells from growth rates in hydrogels of tunable elasticity”, *Molec Microbiol* **84** 874-891 (2012).  
\* these authors contributed equally to this work.  
† co-corresponding authors.
43. S Wang, L Furchtgott, **KC Huang**<sup>†</sup>, J Shaevitz<sup>†</sup>, “Helical insertion of peptidoglycan produces chiral ordering of the bacterial cell wall”, *PNAS* **109** E595-E604 (2012). *Selected for March 15, 2012 issue of Virtual Journal of Biological Physics Research*.  
† co-corresponding authors.
44. TS Ursell and **KC Huang**, “Resolution limits of optical microscopy and the mind”, *Biomed Comp Rev* **7** 27 (2011).
45. **KC Huang**, C Vega, and A Gopinathan, “Conformational changes, diffusion, and collective behavior in monomeric kinesin-based motility”, *J Cond Matt Phys* **23** 374106 (2011).
46. S Teeffelen, S Wang, L Furchtgott, **KC Huang**, Ned S. Wingreen, Joshua W. Shaevitz, and Zemer Gitai, “The bacterial actin MreB rotates and rotation depends on cell-wall assembly”, *Proc Nat Acad Sci USA* **108** 15822-15827 (2011). *Selected for October 1, 2011 issue of Virtual Journal of Biological Physics Research*.
47. RS McIsaac<sup>\*</sup>, **KC Huang**<sup>\*</sup>, A Sengupta, NS Wingreen, “Does the potential for chaos constrain constrain the embryonic cell-cycle oscillator?”, *PLoS Comp Biol*. **7** e1002109 (2011).  
\* these authors contributed equally to this work.
48. L Furchtgott, NS Wingreen, **KC Huang**, “Mechanisms for maintaining cell shape in rod-shaped Gram-negative bacteria”, *Molec. Microbiol.* **81** 340-353 (2011).
49. KE Daly, **KC Huang**, NS Wingreen, and R Mukhopadhyay, “The mechanics of membrane bulging during cell-wall disruption in Gram-negative bacteria”, *Phys. Rev. E* **83** 041922 (2011). *Selected for May 1, 2011 issue of Virtual Journal of Biological Physics Research*.

50. L Grage, AM Keleshian, T Turdzeladze, AR Battle, WC Tay, RP May, SA Holt, SA Contera, M Haertlein, M Moulin, P Pal, PR Rohde, VT Forsyth, A Watts, **KC Huang**<sup>†</sup>, AS Ulrich<sup>†</sup>, and B Martinac<sup>†</sup>, “Clustering and functional interaction of MscL channels,” *Biophys. J.* **100** 1252-1260 (2011). #6 on *Biophys J's Most Read list on 3/16/11*.  
<sup>†</sup> co-corresponding authors.
51. YE Chen\*, C Tropini\*, **KC Huang**<sup>†</sup>, MT Laubi, “A spatial gradient of protein phosphorylation underlies replicative asymmetry in a bacterium,” *Proc Nat Acad Sci USA* **108** 1052-1057 (2011). *Selected for Feb 1, 2011 issue of Virtual Journal of Biological Physics Research*.  
\* these authors contributed equally to this work; <sup>†</sup> co-corresponding authors.
52. **KC Huang** and K Ramamurthi, “Macromolecules that like their membranes curvy”, *Molec Microbiol* **76** 822 (2010).
53. T Fleming, E Becker, S Lee, JY Shin, **KC Huang**, C Bustamante, and K Pogliano, “SpoIIIE assembly mediates septal membrane fission during *Bacillus subtilis* sporulation,” *Genes and Development* **24** 1160 (2010).
54. **KC Huang**, R Mukhopadhyay, B Wen, Z Gitai, and NS Wingreen, “Cell shape and cell-wall organization in Gram-negative bacteria”, *Proc. Nat. Acad. Sci. USA* **105** 19282 (2008).
55. R Mukhopadhyay\*, **KC Huang**\*, and NS Wingreen, “Lipid localization in bacterial cells through curvature-mediated microphase separation”, *Biophysical J.* **95** 1034 (2008).  
\* these authors contributed equally to this work.
56. A Varma, **KC Huang**, and KD Young, “The Min system as a general cell-geometry detection mechanism: patterns of Min oscillations respond to changes in cell shape in aberrantly shaped *Escherichia coli*,” *J. Bacteriol.* **190** 2106 (2008).
57. T Ursell, **KC Huang**, E Peterson, and R Phillips, “Cooperative gating and spatial organization of membrane proteins through elastic interactions,” *PLoS Comp. Biol.* **3** e81 (2007).
58. **KC Huang**, T Wang, and JD Joannopoulos, “Control of melting using nanoscale coatings,” *Proceedings of The Minerals, Metals, and Materials Society* (2007).
59. **KC Huang**, R Mukhopadhyay, and NS Wingreen, “A curvature-mediated mechanism for localization of lipids to bacterial poles,” *PLoS Comp. Biol.* **2** 1357 (2006). *Commentary in Science*.
60. **KC Huang**, T Wang, and JD Joannopoulos, “Nanoscale properties of melting at the surface of semiconductors,” *Phys. Rev. B* **72** 195314 (2005). *Selected for November 21, 2005 issue of Virtual Journal of Nanoscale Science & Technology*.
61. X Jiang, Y Zhang, S Feng, **KC Huang**, Y Yi, and JD Joannopoulos, “Photonic Band-Gaps and Localization in the Thue-Morse Structures,” *Appl. Phys. Lett.* **86** 201110 (2005). *Selected for May 23, 2005 issue of Virtual Journal of Nanoscale Science & Technology*.
62. **KC Huang**, T Wang, and JD Joannopoulos, “Superheating and Induced Melting at Semiconductor Interfaces,” *Phys. Rev. Lett.* **94** 175702 (2005).
63. **KC Huang** and NS Wingreen, “Min oscillations in round bacteria,” *Phys. Bio.* **1** 229 (2004).
64. RV Kulkarni, **KC Huang**, M Kloster, and NS Wingreen, “Pattern Formation within *Escherichia coli*: Diffusion, Membrane Attachment, and Self-Interaction of MinD Molecules,” *Phys. Rev. Lett.* **93** 228103 (2004). *Selected for December 1, 2004 issue of Virtual Journal of Biological Physics*.
65. **KC Huang**, ML Povinelli, and JD Joannopoulos, “Negative effective permeability in polaritonic photonic crystals,” *Appl. Phys. Lett.* **85** 543 (2004). *Selected for August 9, 2004 issue of Virtual Journal of Nanoscale Science & Technology*.
66. **KC Huang**, E Lidorikis, X Jiang, JD Joannopoulos, KA Nelson, P Bienstman, and S Fan, “The nature of lossy Bloch states in polaritonic photonic crystals,” *Phys. Rev. B* **69**, 195111 (2004). *Selected for June 7, 2004 issue of Virtual Journal of Nanoscale Science & Technology*.
67. **KC Huang**, Y Meir, and NS Wingreen, “Dynamic structures in *Escherichia coli*: Spontaneous formation of MinE rings and MinD polar zones,” *Proc. Nat. Acad. Sci. USA* **100**, 12724 (2003). *Selected for November 15, 2003 issue of Virtual Journal of Biological Physics*.
68. **KC Huang**, P Bienstman, JD Joannopoulos, KA Nelson, and S Fan, “Phonon-polariton excitations in photonic crystals,” *Phys. Rev. B* **68**, 075209 (2003). *Selected for September 8, 2003 issue of Virtual Journal of Nanoscale Science & Technology*.
69. **KC Huang**, P Bienstman, JD Joannopoulos, KA Nelson, and S Fan, “Field Expulsion and Reconfiguration in Polaritonic Photonic Crystals,” *Phys. Rev. Lett.* **90**, 196402 (2003). *Selected for May 26, 2003 issue of Virtual Journal of Nanoscale Science & Technology*.
70. **KC Huang**, RJ Needs, and G Rajagopal, “Comment on "Quantum Monte Carlo study of the dipole moment of CO" [J. Chem. Phys. **110**, 11700 (1999)],” *J. Chem. Phys.* **112**, 4419 (2000).

## PATENTS

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A Karalis, D Chan, Y Fink, **KC Huang**, M Ibanescu, JD Joannopoulos, E Lidorikis, E Reed, and M Soljacic, "[Surface-Plasmon Index-Guided \(SPIG\) waveguides and Surface-Plasmon Effective-Index-Guided \(SPEIG\) waveguides](#)," US Patent number 7184641, issued Feb. 27, 2007.

## SELECTED INVITED CONFERENCE TALKS AND WEBINARS

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Gordon Research Conference on Bacterial Cell Surfaces, 2016.

*Single Cell Behavior, Plenary lecture*, American Society for Microbiology Annual Meeting, 2016.

*UC Berkeley Biophysics Retreat, Keynote speaker*, Point Reyes, California, 2015.

Gordon Research Conference on Motile and Contractile Systems, 2015.

*Prokaryotic Development Conference*, Washington, DC, 2015.

*ESF Research Conference on Bacterial Networks*, Sant Felix de Guixols, Spain, 2015.

*Cellular Dynamics and Models Symposium*, CSHL, 2015.

*High Risk/High Reward Symposium*, NIH, 2014.

*All Shapes and Sizes: Form and Function in the Microbial World, Plenary lecture*, American Society for Microbiology Annual Meeting, 2014.

*ASCB Cell Biology Across the Bay Symposium*, Santa Clara University, 2014.

"Let's Have an Awesome Time Doing Science" Symposium, University of California at Berkeley, 2014.

Stanford EXPLORE Program seminar, 2014.

*Building the Cell Symposium*, American Society for Cell Biology Annual Meeting, 2013.

*Cytoskeletal Polymers and Motors Mini-symposium*, American Society for Cell Biology Annual Meeting, 2013.

*New Approaches and Concepts in Microbiology*, EMBL, Heidelberg, Germany, 2013.

*Mechanobiology of Proteins and Cells*, Mount Desert Island Biological Laboratory, Salisbury Cove, Maine, 2013.

*The Great Wall Symposium*, Paris, France, 2013.

*Computational Biology workshop*, Sainsbury Laboratory, 2013.

*Physics of Functional Biological Assemblies: Pushing, Pulling and Sensing Workshop*, Aspen Center for Physics, 2013.

*Nature webcast*, "Using microfluidics for real-time imaging of *in vitro* cell models," 2013.

American Physical Society March Meeting, Baltimore, *Mechanics, Dynamics, and Organization in Cell Growth and Division Symposium*, 2013.

Gotham-Metro Condensed Matter Meeting, *Keynote speaker*, 2012.

Gordon Research Conference on Plant and Microbial Cytoskeletons, 2012.

Gordon Research Conference on Bacterial Cell Surfaces, 2012.

American Society for Microbiology Annual Meeting, *Mechano-Microbiology Symposium*, San Francisco, 2012.

*The Great Wall Symposium*, Lisbon, Portugal, 2011.

*Signals and Space: Spatio-Temporal Patterns in Simple Biosystems*, Niels Bohr Institute, University of Copenhagen, 2011.

*Computation and Collective Behavior in Biological Systems Workshop*, Aspen Center for Physics, 2011.

*Paris Interdisciplinary PhD Symposium*, Ecole Supérieure de Physique et de Chimie Industrielles, Paris, 2011.

*Biological Frontiers of Polymer and Soft Matter Physics Workshop*, University of California at Santa Barbara KITP, 2011.

*How Molecules Come to Life: Biophysics 2016 Workshop*, NSF, 2011.

*Physical and Computational Approaches to Cancer Biology Workshop*, University of California at San Francisco, 2011.

Institute of Mathematics and its Applications, University of Minnesota, *Symposium on Biological Interactions at the Material-Tissue Interface*, 2010.

Hopkins Marine Station, *Microbiology Course*, 2010.

DARPA *Eliminating Antibiotics* Workshop, San Diego, CA, 2010.

Society for General Microbiology Meeting on *Signaling and Systems Biology*, Edinburgh, 2010.

American Physical Society March Meeting, Portland, *Mechanics in Cell Biology Symposium*, 2010.

Fondation des Treilles, *Assembly of Mitochondrial Membranes in Health and Disease*, 2010.

International Conference on Systems Biology, Stanford, *Plenary speaker*, 2009.  
Hopkins Marine Station, *Microbiology Course*, 2009.  
Gordon Research Conference on Osmoregulation and Mechanotransduction, 2009.  
American Physical Society March Meeting, Pittsburgh, *Systems Biology Symposium*, 2009.  
American Physical Society March Meeting, New Orleans, *New Frontiers in Biological Physics Symposium*, 2008.  
Dynamics Days 2008 International Conference on Chaos and Nonlinear Dynamics, 2008.  
American Physical Society March Meeting, Denver, *Elasticity of Biological Membranes Symposium*, 2007.  
TMS Annual Meeting, Orlando, *Computational Thermodynamics and Phase Transformations Symposium*, 2007.  
Society for Industrial and Applied Mathematics, Annual Meeting, Boston, *Spatial and Temporal Inhomogeneities in Bacteria Symposium*, 2006.  
University of Louisville, 6<sup>th</sup> Annual KC Huang Memorial Seminar, Department of Pharmacology and Toxicology, 2006.

## **SELECTED SEMINARS**

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John Innes Centre, 2016.  
Foundation for Fundamental Research on Matter AMOLF, Amsterdam, Netherlands, 2016.  
Biozentrum Centre for Molecular Life Sciences, Basel, Switzerland, 2016.  
Cornell University, Department of Bioengineering, 2016.  
University of Pennsylvania, Department of Bioengineering, 2016.  
University of California at Berkeley, Department of Chemistry *Statistical Physics Seminar*, 2016.  
Pittsburgh University, Department of Physics, 2015.  
BioQuant Institute, Heidelberg University, Heidelberg, Germany, 2015.  
Max Planck Institute for Terrestrial Microbiology, Marburg, Germany, 2015.  
European Molecular Biology Laboratory, Cell Biology Modeling Seminar, Heidelberg, Germany, 2015.  
European Molecular Biology Laboratory, Genome Biology Unit, Heidelberg, Germany, 2015.  
Indiana University, Department of Biology, 2015.  
Massachusetts Institute of Technology, Department of Biology, 2015.  
Washington University, Department of Biology, 2015.  
University of Washington, Department of Microbiology, Genome Sciences, and Medicine, 2015.  
University of California at Berkeley, Department of Plant and Microbial Biology, 2015.  
Rockefeller University, Center for Studies in Physics and Biology, 2014.  
Rice University, Department of Bioengineering, 2014.  
Université Aix Marseille, Institut de Microbiologie de la Méditerranée, 2014.  
Harvard Medical School, Department of Microbiology, 2014.  
University of California at San Diego, Department of Physics, 2014.  
Texas A&M University, Department of Biochemistry and Biophysics, 2014.  
University of Maryland, Department of Physics, 2014.  
Göttingen University, Department of Physics, 2013.  
Johns Hopkins University, Department of Biological Chemistry, 2013.  
Columbia University, Department of Systems Biology, 2013.  
Princeton University, Department of Molecular Biology, 2013.  
University of California at Davis, Department of Mathematics, 2013.  
Ruprecht-Karls-Universität Heidelberg, Zentrum für Molekulare Biologie, Heidelberg, Germany, 2013.  
European Molecular Biology Laboratory, Heidelberg, Germany, 2013.  
Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany, 2013.  
Harvard University, Department of Biological Chemistry, 2012.

NIH Lambda Lunch Meeting, 2012.  
Harvard University, Department of Systems Biology, 2012.  
University of California at Santa Cruz, Department of Microbiology and Environmental Toxicology, 2011.  
Ohio State University, Mathematical Biology Institute, 2010.  
Michigan State University, Department of Microbiology and Molecular Genetics, 2010.  
Boston University, Mitochondrial Affinity Research Collaborative, 2010.  
University of California at Merced, School of Natural Sciences, 2010.  
University of California at San Francisco, Department of Cellular and Molecular Pharmacology, 2009.  
Victor Chang Cardiac Research Institute, Molecular Cardiology and Biophysics, 2009.  
Universidad de Buenos Aires, Department of Physics, 2009.  
University of California at San Diego, Center for Theoretical Biological Physics, 2009.  
Ohio University, Department of Physics, 2009.  
Indiana University, Department of Physics, 2009.  
University of California at Berkeley, Department of Physics, 2009.  
University of California at Santa Barbara, Department of Mechanical Engineering, 2008.  
Stanford University, Biochemistry Research Conference, 2008.  
University of California at Merced, Departments of Physics and Applied Mathematics, 2008.  
Ben Gurion University, Department of Physics, 2008.  
Lehigh University, Department of Physics, 2008.  
University of Chicago, Institute for Biophysical Dynamics, 2008.  
Program in Integrative Information, Computer and Application Sciences, Princeton University, 2004.  
Simons Center for Systems Biology, Institute for Advanced Study, 2008.  
Rutgers University, Department of Physics & Astronomy, 2008.  
Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany, 2007.  
Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, 2007.  
Temasek Life Sciences Laboratory, Singapore, Cell Dynamics Group, 2007.  
American University in Cairo, Department of Biology, 2007.  
Temasek Life Sciences Laboratory, Singapore, Cell Division Group, 2007.  
Bioinformatics Institute, Singapore, 2007.  
Stanford University, Department of Electrical Engineering, 2007.  
University of British Columbia, Department of Physics, 2007.  
Harvard University, Department of Systems Biology, 2007.  
Massachusetts Institute of Technology, Department of Physics, 2007.  
TU Delft Kavli Nanoscience Institute, Department of Molecular Biophysics, 2007.  
Stanford University, Department of Biochemistry, 2007.  
University of Michigan, Ann Arbor, Department of Physics, 2007.  
California Institute of Technology, Department of Chemistry, 2007.  
California Institute of Technology, Department of Applied Physics, 2007.  
Johns Hopkins School of Medicine, Department of Biophysics and Biophysical Chemistry, 2007.  
Carnegie Mellon University, Department of Physics, 2006.  
University of California, San Francisco, Department of Biochemistry and Biophysics, 2006.  
Virginia Tech, Department of Physics, 2005.  
Brown University, Department of Physics, 2005.  
Brandeis University, Molecular and Cellular Biophysics, 2005.



University of Oxford, Department of Microbiology, 2005.

Program in Integrative Information, Computer and Application Sciences, Princeton University, 2004.

Princeton University, Department of Molecular Biology Annual Retreat, 2004.

Brown University, Department of Physics, 2004.

University of Arkansas Medical Science, Department of Physiology, 2004.

Williams College, Department of Physics, 2003.

Boston University, Department of Physics, 2003.

## **SELECTED INVITED TEACHING AND LECTURES**

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EMBL Practical Course: **Microscopy, Modeling, and Biophysical Methods** (2014).

Woods Hole Marine Biological Institute: **Physiology Course** (2010-2012).

Cold Spring Harbor Laboratory: **Topics in Biology** (2010).

American Physical Society March Meeting, **Opportunities in Biological Physics Workshop** (2008).

Temasek Lifesciences Laboratory, Singapore: **Cellular Mechanics** (2007).

Bioinformatics Institute, Singapore: **Physical Biology** (2007).

## **ADVISING**

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**Anchal Chandra** (postdoctoral scholar, joint with Devaki Bhaya)

**Nickolay Korabel** (postdoctoral scholar, joint with Ajay Gopinathan)

**Konstantinos Tsekouras** (postdoctoral scholar, joint with Ajay Gopinathan)

**Enrique Rojas** (postdoctoral scholar, joint with Julie Theriot)

**Jennifer Hsin** (postdoctoral scholar)

**Gaurav Misra** (postdoctoral scholar)

**Pinkesh Patel** (postdoctoral scholar)

**Tristan Ursell** (postdoctoral scholar)

**Russell Monds** (postdoctoral scholar)

**Samantha Desmarais** (postdoctoral scholar)

**Carolina Tropini** (Biophysics, graduate advisee)

**Sandhya Sinha** (Biophysics, graduate advisee)

**Rosanna Chau** (Bioengineering, graduate advisee)

**Gabriel Billings** (Physics, graduate advisee)

**Alexandre Colavin** (Biophysics, graduate advisee)

**Timothy Lee** (Bioengineering, graduate co-advisee with Markus Covert lab)

**Amanda Miguel** (Bioengineering, graduate advisee)

Kenneth Hu (Biophysics, rotation student)

Atish Agarwala (Physics, rotation student)

Ian Marshall (Thesis committee)

Bryan Petzold (Thesis committee)

Amanda Miguel (Bioengineering, rotation student)

Lauren Chircus (Chemical and Systems Biology, rotation student and thesis committee)

Jillynne Quinn (Biophysics, rotation student and thesis committee)

Krystal St. Julien (Biochemistry, rotation student)

Isis Trenchard (Bioengineering, rotation student)  
Reza Mahalati (Electrical Engineering, rotation student)  
Pakpoom Subsoontorn (Bioengineering, rotation student)  
Jonathan Karr (Markus Covert lab, thesis committee)  
Jayodita Sanghvi (Markus Covert lab, thesis committee)  
Tony Tsai (James Ferrell lab, thesis committee)  
Jeremy Chang (James Ferrell lab, thesis committee)  
Graham Anderson (James Ferrell lab, thesis committee)  
Allison Mo (William Burkholder lab, thesis committee)  
David Halladin (Julie Theriot lab, thesis committee)  
Natalie Dye (Julie Theriot lab, thesis committee)  
Kristen Earle (Justin Sonnenburg lab, thesis committee)  
Jon Lynch (Justin Sonnenburg lab, thesis committee)  
Gaurav Chopra (Michael Levitt lab, thesis committee)  
Leigh Harris (Julie Theriot lab, thesis committee)  
Koshlan Mayer-Blackwell (Alfred Spormann lab, thesis committee)  
Jennifer Lahti (Jennifer Cochran lab, thesis committee)

## PRESENTATIONS BY ADVISEES

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(poster and invited talk) C Tropini, **KC Huang**. “The Beginning of the Ends: Localization of Lipids to Bacterial Poles,” *EMBO Biomembranes conference*, Cargese, Corsica, France, June 2008.

(contributed talk) C Tropini. “Tradeoff between localization and expression levels in flagellar pole development of the bacterium *Caulobacter crescentus*”. *Molecular Biophysics Seminar*, Stanford University, Stanford, CA, November 2009.

(poster) C Tropini, S Sciochetti, A Newton, **KC Huang**. “Tradeoff between localization and expression levels in flagellar pole development of the bacterium *Caulobacter crescentus*,” *Biophysical Society annual meeting*, San Francisco, CA, Feb 2010.

(poster) Andrew R Battle, Stephan L Grage, Asbed M Keleshian, Tamta Turdzeladze, Wee C Tay, Roland P May, Stephen A Holt, Sonia Antoranz Contera, Michael Haertlein, Martine Moulin, Prithwish Pal, Paul R Rohde, V Trevor Forsyth, **KC Huang**, Anthony Watts, Anne S Ulrich and B Martinac. “Clustering and functional interactions of MscL channels,” *Biophysical Society Annual Meeting*, San Francisco, CA, Feb 2010.

(contributed talk) LA Furchtgott, NS Wingreen, **KC Huang**. “Cell-wall dynamics in growing bacteria,” *American Physical Society March Meeting*, Portland, OR, Mar 2010.

(contributed talk) C Tropini, **KC Huang**. “The role of spatial asymmetries in the development of the bacterium *Caulobacter crescentus*.” *American Physical Society March Meeting*, Portland, OR, March 2010.

(invited talk) C Tropini. “Modeling and engineering intracellular organization”, *Department of Biophysics seminar*, University of British Columbia, Vancouver, Canada, May 2010.

(poster) C Tropini, S Sciochetti, A Newton, **KC Huang**. “Tradeoff between localization and expression levels in flagellar pole development of the bacterium *Caulobacter crescentus*,” *Physics2Life workshop*, Weizmann Institute, Rehovot, Israel, May 2010.

(poster) S Wang, LA Furchtgott, **KC Huang**, JW Shaevitz. “The handedness of bacteria: three ways to make a rod-shaped cell,” *American Society of Microbiology annual meeting*, San Diego, CA, May 2010.

(poster) TS Ursell, E Trepagnier, JA Theriot, **KC Huang**. “Modeling Outer Membrane Growth in Gram-Negative Bacteria,” *Bio-X Symposium*, Stanford University, June 2010.

(poster) G Auer, H Tuson, LD Renner, **KC Huang**, D Weibel. “Elastic deformations during bacterial cell growth,” *GRC Bacterial Cell Surfaces*, Colby-Sawyer College, June 2010.

(poster) LA Furchtgott, NS Wingreen, **KC Huang**. “Mechanisms of cell-shape maintenance in Gram-negative bacteria,” *qBio Annual Meeting*, Santa Fe, NM, Aug 2010.

(poster) LA Furchtgott, NS Wingreen, KC Huang. "Physical Mechanisms for Bacterial Cell Shape Maintenance," *Dynamics of Peptidoglycan Structure and Function Workshop*, Baeza, Spain, Oct 2010.

(contributed talk) C Tropini. "Spatial gradient of protein phosphorylation underlies replicative asymmetry in a bacterium". *Microbiology Research Series*, Stanford University, Stanford, CA, March 2011.

(contributed talk) LA Furchtgott, NS Wingreen, KC Huang. "Mechanisms for maintaining cell-shape in rod-shaped Gram-negative bacteria," *Biophysical Society Annual Meeting*, Baltimore, MD, Mar 2011.

(poster) C Tropini, YE Chen, K Jonas, CG Tsokos, MT Laub, **KC Huang**, "Spatial gradient of protein phosphorylation underlies replicative asymmetry in a bacterium," *BioX Symposium*, Stanford, CA, March 2011.

(poster) G Billings, E Jin, T Ursell, **KC Huang**. "Cooperative gating of membrane proteins in a crowded environment," *Biomechanical Engineering Conference at Stanford*, Stanford, CA, May 2011.

(poster) Rosanna Chau, Tristan Ursell, Susanne Wisen, Devaki Bhaya, **KC Huang**. "Modeling Phototaxis in the Cyanobacterium *Synechocystis* PCC6803". *Biomechanical Engineering Conference at Stanford*, Stanford, CA, May 2011.

(invited talk) C Tropini. "Spatial gradient of protein phosphorylation underlies replicative asymmetry in a *Caulobacter crescentus*" *American Society for Microbiology Annual Meeting*, New Orleans, LA, May 2011.

(invited talk) B Martinac, SL Grage, AM Keleshian, T Turdzeldze, AR Battle WC Tay RP May SA Holt, SA Contera, M Haertlein, M Moulin, P Pal, PR Rohde, VT Forsyth, A Watts, **KC Huang**, AS Ulrich. "Membrane bilayer-mediated clustering and functional interaction of MscL, the mechanosensitive channels of large conductance from *E. coli*," *International Conference on Comparative Physiology and Biochemistry*, Nagoya, Japan, June 2011.

(poster) G Billings, E Jin, T Ursell, **KC Huang**. "Cooperative gating of membrane proteins in a crowded environment," *EMBO Biomembranes conference*, Cargese, Corsica, France, June 2011.

(poster) C. Tropini, Y. E. Chen, K. Jonas, C. G. Tsokos, M. T. Laub, **KC Huang**, "Spatial gradient of protein phosphorylation underlies replicative asymmetry in a bacterium," *BioX Symposium*, Stanford, CA. March 2011 and September 2011.

(poster) TK Lee, MW Covert, **KC Huang**. "Single-molecule dynamics of cell wall synthesis complexes in live *E. coli*," *Single molecules meet systems biology*, HHMI Janelia Farm, Ashburn, VA, October 2011.

(poster) C Tropini, A. Stewart, D. Swem, M. Hidestrand, S. Sinha, Z. Gitai and **KC Huang**, "Exploring mechanisms for cell width control in Gram-negative bacteria with PALM and digital PCR," *Single Molecules Meet Systems Biology Conference*, Janelia Farm Research Campus, Ashburn, VA. October 2011.

(contributed talk) C Tropini, A. Stewart, D. Swem, M Hidestrand, S. Sinha, Z. Gitai and **KC Huang**, "Control of cell width in bacteria" *Bioengineering retreat*, Santa Cruz, CA, October 2011.

(poster) TS Ursell, E Trepagnier, JA Theriot, **KC Huang**. "Modeling Outer Membrane Growth in Gram-Negative Bacteria," *Zing Conference on Bacterial Physiology*, Cancun Mexico, November 2010.

(poster) J Hsin, A Gopinathan, **KC Huang**. "Nucleotide-dependent conformations of FtsZ dimers and force generation observed through all-atom molecular dynamics simulations." 4th ASM Conference on Prokaryotic Cell Biology and Development, Montreal, Canada, May 2012.

(poster) C Tropini and **KC Huang**. "Modeling the effects of changes in protein localization and abundance on development in the bacterium *Caulobacter crescentus*" *Conference on Prokaryotic Cell Biology and Development*, Montreal, Quebec, Canada. May 2012.

(contributed talk) TS Ursell, **KC Huang**. "Growth Patterning and Shape in *Escherichia coli*," *American Society of Microbiology General Meeting*, San Francisco, June 2012.

(poster) R Chau, T Ursell, S Wisen, D Bhaya, **KC Huang**. "Modeling Emergent Behaviors due to the Phototactic Response in *Synechocystis* Sp. PCC6803", *American Society for Microbiology General Meeting*, San Francisco, June 2012.

(poster) S Desmarais, R Monds, M de Pedro, **KC Huang**. "UPLC Peptidoglycan Analysis of Bacteria to Determine Biophysical Factors Regulating Morphogenesis and Pathogenesis," *American Society for Microbiology General Meeting*, San Francisco, CA, June 2012.

(poster) C. Tropini, T. K. Lee, R. Monds and K.C. Huang. "Mechanisms For Cell Width Control In Gram-negative Bacteria". *American Society of Microbiology General Meeting*, San Francisco, CA. June 2012.

(contributed talk) TK Lee, **KC Huang**. "Single-molecule imaging of bacterial cell-wall synthesis complexes," *Molecular Biophysics Seminar*, Stanford University, Stanford, CA, April 2012.

(poster and talk) G Billings, **KC Huang**. "Unstable L-forms: *De Novo* Morphogenesis in *E. coli*," *Bioengineering retreat*,

Santa Cruz, CA, October 2011.

(contributed talk) G Billings, **KC Huang**. "De Novo Synthesis of the Cell Wall in *E. coli*: Reversion of L-forms," American Society for Microbiology General Meeting, San Francisco, CA, June 2012.

(poster) E Sedivy, A Grote, R Chau, **KC Huang**, D Bhaya. "Characterizing phototaxis of thermophilic *Synechococcus* sp.," American Society of Microbiology annual meeting, San Francisco, CA, June 2012.

(poster) Samantha Desmarais, Russell Monds, Miguel de Pedro, **KC Huang**. "UPLC Peptidoglycan Analysis of Rod-shaped Bacteria to Determine Biophysical Factors Regulating Morphogenesis and Pathogenesis," Queenstown Molecular Biology Conference, Queenstown, New Zealand, August 2012.

(contributed talk) G Billings and **KC Huang**. "De Novo Synthesis of the Cell Wall in *E. coli*: Reversion of L-forms," American Society for Cell Biology Annual Meeting, San Francisco, CA, December 2012.

(poster) C Tropini and **KC Huang**. "Spatial Gradients in Bacteria," American Society for Cell Biology Annual Meeting, San Francisco, CA, December 2012.

(poster) T Ursell and **KC Huang**. "Growth Dynamics and Shape Control in Gram-Negative Bacteria," American Society for Cell Biology Annual Meeting, San Francisco, CA, December 2012.

(invited talk) J Hsin and **KC Huang**. "Relating the structural dynamics of a bacterial tubulin to its division function," University of California at Merced, Merced, CA, September 2012.

(contributed talk) J Hsin and **KC Huang**. "Relating the structural dynamics of a bacterial tubulin to its division function," 13<sup>th</sup> Annual Symposium, Biomedical Computation at Stanford, Stanford, CA, October 2012.

(contributed talk) Tristan Ursell and **KC Huang**. "Quantitation of cell wall and outer membrane growth that indicates how to robustly build rod-like bacteria," Annual Meeting of the American Society for Cell Biology, San Francisco, CA, December 2012.

(poster) T Ursell and **KC Huang**. "Growth Dynamics and Shape Control in Gram-negative Bacteria," Annual Meeting of the American Society for Cell Biology, San Francisco, CA, December 2012.

(contributed poster) C. Tropini and **K.C. Huang**. "Spatial Gradients in Bacteria". American Society for Cell Biology Annual Meeting, San Francisco, California, USA, December 2012.

(contributed talk) G Billings and **KC Huang**. "De novo synthesis of the cell wall in *E. coli*: Reversion of L-form," Annual Meeting of the American Society for Cell Biology, San Francisco, CA, December 2012.

(invited talk) J Hsin and **KC Huang**. "Discovering the molecular mechanisms of the bacterial division machinery." Bioengineering Department Seminar, University of California - Los Angeles, Los Angeles, CA, January 2013.

(invited talk) J Hsin and **KC Huang**. "Discovering the molecular mechanisms of the bacterial division machinery." Biophysics and Molecular Cell, Developmental Biology Department Seminar, University of Michigan - Ann Arbor, Ann Arbor, MI, February 2013.

(poster) G Billings and **KC Huang**. "De novo synthesis of the cell wall in *E. coli*: Reversion of L-form," BioX Interdisciplinary Initiatives Symposium, Stanford, CA, February 2013.

(invited talk) J Hsin and **KC Huang**. "Discovering the molecular mechanisms of the bacterial division machinery." Biochemistry and Biophysics Department Seminar, University of Pennsylvania, Philadelphia, PA, March 2013.

(contributed talk) T Ursell and **KC Huang**. "Quantitation of cell wall and outer membrane growth that indicates how to robustly build rod-like bacteria," 16th Annual Bay Area Microbial Pathogenesis Symposium, San Francisco, CA, March 2013.

(poster) R Chau, D Bhaya, and **KC Huang**. "Single-cell characterization of the phototactic response in *Synechocystis* sp. PCC 6803." Berkeley Annual Microbiology Student symposium, Berkeley, CA, April 2013.

(poster) R Chau, D Bhaya, and **KC Huang**. "Motility enhancement through surface modification is sufficient for emergent behaviors during phototaxis." Gordon Conference 2013 on Signal Transduction and Microbial Adhesion, Salve Regina University, Newport, RI, April 2013.

(invited talk) C Tropini and **KC Huang** "On growth and form – a bacterial perspective", Simon Fraser University, Vancouver, Canada. Biophysics Seminar, May 2013.

(contributed talk) C. Tropini and **K.C. Huang** "From cell wall structure to morphogenesis" American Society for Microbiology Meeting, Denver, CO. Young Investigator Presentation, May 2013.

(invited talk) C Tropini and **KC Huang** "Building cell shape", Bio-X Fellows Symposium, Stanford University, Stanford, CA, June 2013.

(contributed poster) C Tropini, TK Lee, J Hsin, SM Desmarais, T Ursell, RD Monds and **KC Huang**. "The role of PBP2 in bacterial morphogenesis at the single-molecule and cellular scales". The Great Wall Symposium, Paris, France, September 2013.

(invited talk) C. Tropini and **K.C. Huang** "On growth and form – a bacterial perspective", University of British Columbia, Vancouver, Canada. Immunology and Microbiology Department Seminar, October 2013.

(invited talk) J Hsin and **KC Huang**. "Taking apart a bacterial machinery, and finding ways to break it." Earl Stadtman Symposium: Biomedical Engineering/Biophysics/Physics, National Institutes of Health, Bethesda, MD, December 2013.

(invited talk) J Hsin and **KC Huang**. "Physical and molecular mechanisms of the bacterial division machinery." Physics Department Seminar, Northwestern University, Evanston, IL, January 2014.

(contributed talk) R Chau, D Bhaya, and **KC Huang**. "The light that guides us: A cyanobacterial story. Insights into light-dependent phototaxis in the cyanobacterium *Synechocystis* sp. PCC 6803." Carnegie Institute Department of Plant Biology Friday Seminar, Stanford, CA, January 24 2014.

(contributed talk) A Colavin, J Hsin and **KC Huang**. "Keeping Things Straight: the molecular basis for bacterial shape control," Systems Biology Seminar Series, Stanford, CA, January 2014.

(poster) R Chau, T Ursell, D Bhaya, and **KC Huang**. "Motility enhancement through surface modification is sufficient for emergent behaviors during phototaxis." Biophysical Society 58th Annual Meeting, San Francisco, CA, February 2014.

(poster) AV Miguel, J Hsin, T Liu, G Tang, RB Altman, **KC Huang**. "Variation in the Binding Pocket of an Inhibitor of the bacterial division protein FtsZ across genotypes, nucleotide states and species" 58th Annual Meeting, Biophysical Society CA, February 2014.

(poster) G Billings, N Ouzonov, T Ursell, S Desmarais, JW Shaevitz, Z Gitai, and **KC Huang**. "Curvature-dependent localization of the bacterial cytoskeleton drives *de novo* morphogenesis in *Escherichia coli*," Annual Meeting of the Biophysical Society, San Francisco, CA, February 2014.

(poster) A Colavin, J Hsin and **KC Huang**. "Effects of Polymerization and Nucleotide Identity on the Conformational Dynamics of the Bacterial Actin Homolog MreB," Biophysical Society, San Francisco, CA, February 2014.

(contributed talk) A Colavin, J Hsin and **KC Huang**. "Keeping Things Straight: the molecular basis for bacterial shape control," Molecular Biophysics Seminar Series, Stanford, CA, February 2014.

(poster) G Billings, N Ouzonov, T Ursell, S Desmarais, JW Shaevitz, Z Gitai, and **KC Huang**. "Curvature-dependent localization of the bacterial cytoskeleton drives *de novo* morphogenesis in *Escherichia coli*," BioX Interdisciplinary Initiatives Symposium, Stanford, CA, March 2014.

(poster) T Ursell, J Nguyen, RD Monds, A Colavin, G Billings, N Ouzonov, Z Gitai, JW Shaevitz, and **KC Huang**. "Growth Dynamics and Shape Control in Gram-negative Bacteria," 58th Annual Meeting of the Biophysical Society, San Francisco, CA, February 2014.

## TEACHING

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**Woods Hole Marine Biological Institute** (2010,2011,2012): Instructor, *Physiology* course.

**Stanford University**, Course Design Boot Camp participant (2011).

**Stanford University**, Department of Bioengineering (2010): Designed and instructed new course *BioE 42: Physical Biology of Cells* (30 lecture hours).

**Stanford University**, Department of Bioengineering (2008): Designed and instructed new course *BioE 334: Engineering Principles of Molecular Biology* (30 lecture hours).

**Princeton University**, Department of Molecular Biology (2005-2007): Designed and instructed new course *Introduction to Perl and MATLAB for Biology* (35 students/yr., 16 lecture hours/yr).

**Massachusetts Institute of Technology**, (2000-2002): Teaching Assistant for *Physics 8.511-8.512: Theory of Solids I&II*.

**California Institute of Technology**, (1997-1998): Teaching Assistant for *Applied Physics 130: Optoelectronics*.

## SERVICE

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**Co-organizer**, *New Approaches in Microbiology III Conference, European Molecular Biology Laboratory, 2017*.

**Co-organizer**, *EMBO course on Modelling Cellular Processes in Space and Time, Porquerolles, 2016*.

**Co-organizer**, *Great Wall Symposium, Institut Pasteur, 2015.*

**Co-organizer**, *New Approaches in Microbiology II Conference, European Molecular Biology Laboratory, 2015.*

**Co-organizer**, *Multiscale Modeling of Cell Wall Mechanics and Growth in Walled Cells, Banff International Research Station, 2015.*

**Faculty Search Committee**, Bioengineering Department, 2013-2014.

**Co-organizer**, “**Bacteria Meet Physics II**” Summer Workshop, Aspen Center for Physics, 2014.

**Referee**, *Science, Nature, Nature Methods, PNAS, Mol Sys Biol, Phys Rev Lett, Phys Rev E, Molec Microbiol, J Bacteriol, Phys Biol, Appl Env Microbiol, Biophys J, J Phys Chem, PLoS Biol, PLoS Comp Biol, PLoS One, Small, Biochemistry, BMC Biol.*

**Organizing Committee**, 10<sup>th</sup> *International Workshop on Nanomechanical Sensing*, Stanford, CA 2013.

**Microbiology & Immunology Admissions Committee**, 2013.

**Organizer**, “**Physical Mechanisms of Growth**” Symposium, American Physical Society March Meeting, 2012.

**Bioengineering Department Admissions Committee**, 2008-2011.

**Co-organizer**, **Bioengineering Departmental Colloquium**, 2010-2011.

**Co-organizer**, **Bioengineering Departmental Retreat**, 2011.

**Reviewer**, *NSF Center for Theoretical Biophysics* midterm evaluation.

**Co-chair**, **Junior Advisory Group**, American Society for Microbiology, 2010-2014.

**Organizer**, “**Mechanics in Cell Biology**” Symposium, American Physical Society March Meeting, 2010.

**Co-organizer**, “**Evolutionary Perspectives on Mechanisms for Cellular Organization**” Workshop, Kavli Institute for Theoretical Physics, Santa Barbara, 2010.

**Organizer**, “**Frontiers in Quantitative Biology**” Seminar Series, Stanford University, 2009-present.

**Organizer**, “**Bug Club Microbiology**” Seminar Series, Stanford University, 2009-present.

**Co-organizer**, “**Bacteria Meet Physics**” Summer Workshop, Aspen Center for Physics, 2009.

**Organizer**, “**Cellular Imaging at the Nanoscale**” Symposium, American Physical Society March Meeting, 2009.

**Editor**, **PMC Biophysics** (2008-2010).

**Editor**, **BMC Biophysics** (2010-present).

**Princeton University, Department of Molecular Biology Postdoc Committee Chairman** (2005-2007): organized seminar series and annual career symposium.

**MIT Alumni Club of Princeton**, (2005-2007): board member and co-director of Young Alumni events.

## REFERENCES

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**Ned Wingreen**, Professor of Molecular Biology  
Princeton University, Lewis-Thomas 347  
Princeton, NJ 08544  
(609) 258-8476  
wingreen@princeton.edu

**John Joannopoulos**, Francis Wright Davis Professor of Physics  
Massachusetts Institute of Technology, 12-116  
Cambridge, MA 02139  
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**Gunaretnam Rajagopal**, Executive Director, Bioinformatics  
The Cancer Institute of New Jersey  
Room 5572, 195 Little Albany Street  
New Brunswick, NJ 08903

**Bonnie Bassler**, Professor of Molecular Biology  
Princeton University, Lewis-Thomas 329  
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**Rob Phillips**, Professor of Applied Physics  
Caltech, 159 Broad, MC 114-96  
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