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Basic Life Research Scientist
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Bio

ACADEMIC APPOINTMENTS

- Basic Life Research Scientist, Bioengineering

Publications

PUBLICATIONS

- **Sensing the shape of a surface by tightly surface-bound filaments.** *Proceedings of the National Academy of Sciences of the United States of America*
Shi, H., Nguyen, J., Huang, J. A., Gitai, Z., Shaevitz, J., Bratton, B. P., Gopinathan, A., Grason, G., Huang, K. C.
2025; 122 (52): e2526131122
- **Nutrient competition predicts gut microbiome restructuring under drug perturbations.** *Cell*
Shi, H., Newton, D. P., Nguyen, T. H., Estrela, S., Sanchez, J., Tu, M., Ho, P. Y., Zeng, Q., DeFelice, B. C., Sonnenburg, J. L., Huang, K. C.
2025
- **Modulation of bacterial cell size and growth rate via activation of a cell envelope stress response.** *mBio*
Miguel, A., Zietek, M., Shi, H., Sueki, A., Corona, F., Maier, L., Verheul, J., den Blaauwen, T., Van Valen, D., Typas, A., Huang, K. C.
2025: e0228125
- **Bacterial cell widening alters periplasmic size and activates envelope stress responses.** *The EMBO journal*
Zietek, M., Miguel, A., Shi, H., Khusainov, I., Asmar, A. T., Ram, S., Wartel, M., Sueki, A., Schorb, M., Goulian, M., Collet, J. F., Beck, M., Huang, et al
2025
- **Abundance measurements reveal the balance between lysis and lysogeny in the human gut microbiome.** *Current biology : CB*
Lopez, J. A., McKeithen-Mead, S., Shi, H., Nguyen, T. H., Huang, K. C., Good, B. H.
2025
- **Harnessing gut microbial communities to unravel microbiome functions.** *Current opinion in microbiology*
Giri, S., Shi, H., Typas, A., Huang, K. C.
2025; 83: 102578
- **Abundance measurements reveal the balance between lysis and lysogeny in the human gut microbiome.** *bioRxiv : the preprint server for biology*
Lopez, J., McKeithen-Mead, S., Shi, H., Nguyen, T. H., Huang, K. C., Good, B. H.
2024
- **Complex state transitions of the bacterial cell division protein FtsZ.** *Molecular biology of the cell*
Knapp, B. D., Shi, H., Huang, K. C.
2024: mbcE23110446
- **Profiling the human intestinal environment under physiological conditions.** *Nature*

Shalon, D., Culver, R. N., Grembi, J. A., Folz, J., Treit, P. V., Shi, H., Rosenberger, F. A., Dethlefsen, L., Meng, X., Yaffe, E., Aranda-Diaz, A., Geyer, P. E., Mueller-Reif, et al

2023

- **Physiological and regulatory convergence between osmotic and nutrient stress responses in microbes.** *Current opinion in cell biology*
Brauer, A. M., Shi, H., Levin, P. A., Huang, K. C.
2023; 81: 102170
- **Previously uncharacterized rectangular bacterial structures in the dolphin mouth.** *Nature communications*
Dudek, N. K., Galaz-Montoya, J. G., Shi, H., Mayer, M., Danita, C., Celis, A. I., Viehboeck, T., Wu, G., Behr, B., Bulgheresi, S., Huang, K. C., Chiu, W., Relman, et al
2023; 14 (1): 2098
- **Optimization of the 16S rRNA sequencing analysis pipeline for studying invitro communities of gut commensals.** *iScience*
Celis, A. I., Aranda-Diaz, A., Culver, R., Xue, K., Relman, D., Shi, H., Huang, K. C.
2022; 25 (4): 103907
- **Multiple conserved states characterize the twist landscape of the bacterial actin homolog MreB.** *Computational and structural biotechnology journal*
Knapp, B. D., Ward, M. D., Bowman, G. R., Shi, H., Huang, K. C.
2022; 20: 5838-5846
- **Morphological and Transcriptional Responses to CRISPRi Knockdown of Essential Genes in Escherichia coli.** *mBio*
Silvis, M. R., Rajendram, M., Shi, H., Osadnik, H., Gray, A. N., Cesar, S., Peters, J. M., Hearne, C. C., Kumar, P., Todor, H., Huang, K. C., Gross, C. A.
2021: e0256121
- **Starvation induces shrinkage of the bacterial cytoplasm.** *Proceedings of the National Academy of Sciences of the United States of America*
Shi, H., Westfall, C. S., Kao, J., Odermatt, P. D., Anderson, S. E., Cesar, S., Sievert, M., Moore, J., Gonzalez, C. G., Zhang, L., Elias, J. E., Chang, F., Huang, et al
2021; 118 (24)
- **Precise regulation of the relative rates of surface area and volume synthesis in bacterial cells growing in dynamic environments.** *Nature communications*
Shi, H., Hu, Y., Odermatt, P. D., Gonzalez, C. G., Zhang, L., Elias, J. E., Chang, F., Huang, K. C.
2021; 12 (1): 1975
- **Hyperosmotic Shock Transiently Accelerates Constriction Rate in Escherichia coli.** *Frontiers in microbiology*
Sun, J., Shi, H., Huang, K. C.
2021; 12: 718600
- **Environmental and Physiological Factors Affecting High-Throughput Measurements of Bacterial Growth.** *mBio*
Atolia, E., Cesar, S., Arjes, H. A., Rajendram, M., Shi, H., Knapp, B. D., Khare, S., Aranda-Diaz, A., Lenski, R. E., Huang, K. C.
2020; 11 (5)
- **The inner membrane protein YhdP modulates the rate of anterograde phospholipid flow in Escherichia coli.** *Proceedings of the National Academy of Sciences of the United States of America*
Grimm, J., Shi, H., Wang, W., Mitchell, A. M., Wingreen, N. S., Huang, K. C., Silhavy, T. J.
2020
- **Pictures of Tongues Sticking Out.** *Trends in endocrinology and metabolism: TEM*
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2020
- **Chiral twisting in a bacterial cytoskeletal polymer affects filament size and orientation.** *Nature communications*
Shi, H., Quint, D. A., Grason, G. M., Gopinathan, A., Huang, K. C.
2020; 11 (1): 1408
- **Klebsiella michiganensis transmission enhances resistance to Enterobacteriaceae gut invasion by nutrition competition.** *Nature microbiology*
Oliveira, R. A., Ng, K. M., Correia, M. B., Cabral, V., Shi, H., Sonnenburg, J. L., Huang, K. C., Xavier, K. B.

2020

- **AimB Is a Small Protein Regulator of Cell Size and MreB Assembly.** *Biophysical journal*
Werner, J. N., Shi, H. n., Hsin, J. n., Huang, K. C., Gitai, Z. n., Klein, E. A.
2020
- **FtsZ-Independent Mechanism of Division Inhibition by the Small Molecule PC190723 in Escherichia coli** *ADVANCED BIOSYSTEMS*
Khare, S., Hsin, J., Sorto, N. A., Nepomuceno, G. M., Shaw, J. T., Shi, H., Huang, K.
2019; 3 (11)
- **FtsZ-Independent Mechanism of Division Inhibition by the Small Molecule PC190723 in Escherichia coli.** *Advanced biosystems*
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2019; 3 (11): e1900021
- **Chromosome Organization: Making Room in a Crowd.** *Current biology : CB*
Shi, H., Huang, K. C.
2019; 29 (13): R630–R632
- **Conservation of conformational dynamics across prokaryotic actins.** *PLoS computational biology*
Ng, N., Shi, H., Colavin, A., Huang, K. C.
2019; 15 (4): e1006683
- **RodZ modulates geometric localization of the bacterial actin MreB to regulate cell shape** *NATURE COMMUNICATIONS*
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- **How to Build a Bacterial Cell: MreB as the Foreman of E. coli Construction** *CELL*
Shi, H., Bratton, B. P., Gitai, Z., Huang, K.
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- **Deep Phenotypic Mapping of Bacterial Cytoskeletal Mutants Reveals Physiological Robustness to Cell Size** *CURRENT BIOLOGY*
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- **Rapid, precise quantification of bacterial cellular dimensions across a genomic-scale knockout library.** *BMC biology*
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2017; 15 (1): 17-?
- **Strain Library Imaging Protocol for high-throughput, automated single-cell microscopy of large bacterial collections arrayed on multiwell plates.** *Nature protocols*
Shi, H., Colavin, A., Lee, T. K., Huang, K. C.
2017; 12 (2): 429-438
- **Single-molecule imaging reveals modulation of cell wall synthesis dynamics in live bacterial cells** *NATURE COMMUNICATIONS*
Lee, T. K., Meng, K., Shi, H., Huang, K. C.
2016; 7
- **A Comprehensive, CRISPR-based Functional Analysis of Essential Genes in Bacteria** *CELL*
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- **Disruption of lipid homeostasis in the Gram-negative cell envelope activates a novel cell death pathway** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
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- **A Formalized Design Process for Bacterial Consortia That Perform Logic Computing** *PLOS ONE*
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