

## LANYING ZENG

Texas A&M University

Assistant Professor, Department of Biochemistry and Biophysics, Center for Phage Technology

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### EDUCATION

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#### B.E. in Aerodynamics

July 1998

Beijing University of Aeronautics and Astronautics

Thesis: Experimental Study on the Interaction between an Airfoil and a Fuselage in a Water Tank

Advisor: Hua Zhang

#### M.E. in Fluid Mechanics

March 2001

Beijing University of Aeronautics and Astronautics

Thesis: A Finite Volume TVD Scheme for Hypersonic Flows with Chemical Reactions

Advisor: Songping Wu

#### Ph.D. in Theoretical and Applied Mechanics, Minor in Computational Science and Engineering

May 2007

University of Illinois at Urbana-Champaign

Thesis: Interaction Between a Spherical Particle and Wall-bounded Flows at Finite Reynolds Number

Advisor: S. Balachandar

### EMPLOYMENT

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#### Assistant Professor

2012 - Present

Department of Biochemistry and Biophysics

Center for Phage Technology

Texas A&M University, College Station, TX

#### Postdoctoral Research Associate

2007 – 2011

Department of Physics

University of Illinois at Urbana-Champaign, Urbana, IL

Mentor: Ido Golding

### HONORS AND AWARDS

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Mountain Memorial Fund Scholarship, Society for General Physiology and Walter L. Wilson Endowed Scholarship Fund for Physiology Summer Course, Marine Biological Laboratory, Woods Hole, MA 2008

Thomas J. Dolan Graduate Award, University of Illinois at Urbana-Champaign, Urbana, IL 2005

### JOURNAL PUBLICATIONS

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Gordeeva, J., Morozova, N., Sierro, N., Isaev, A., Tsvetkova, K., Matlashov, M., Ivanov, N., **Zeng, L.**, and Severinov, K., "BREX(Pgl) System of *Escherichia coli* Distinguishes Self from Non-Self by Methylation of a Specific DNA Site", in prep for submission.

Wang, X., Park, S., **Zeng, L.**, Jain, A., and Ha, J., "Towards Single-cell Single-molecule Pull-down", under review, *Biophysical Journal*.

Shao, Q., Cortes, M., Trinh, J.T., Guan, J., Balázsi, G., and **Zeng, L.**, "Coupling of DNA Replication and Negative Feedback Controls Gene Expression for Cell-fate Decision", under review, *iScience*

Trinh, J.T., Alkahtani, M.A., Rampersaud, I., Rampersaud, A., Scully, M., Young, R.F., Hemmer, P., and **Zeng, L.**, "Fluorescent Nanodiamond-bacteriophage Conjugates Maintain Host Specificity", *Biotechnology and Bioengineering* doi: 10.1002/bit.26573 (2018) PMID: 29460442

Cortes, M., Trinh, J.T., **Zeng, L.**, and Balázsi, G., "Late-arriving Signals Contribute Less to Cell Fate Decisions", *Biophysical Journal* 113(9), 2110-2120 (2017) PMID: 29117533, PMCID: PMC5685783

Trinh, J.T. and **Zeng, L.**, "Virus Interactions: Competition or Cooperation?", *Future Microbiology* 10.2217/fmb-2017-0048 (2017) PMID: 28604103

Guan, J., Shi, X., Burgos, R., and **Zeng, L.**, “Visualization of Phage DNA Degradation by a Type I CRISPR-Cas System at the Single-cell Level”, *Quantitative Biology* 5(1), 67-75 (2017) PMID: 29119038, PMCID: PMC5673134

Trinh, J.T., Székely, T., Shao, Q., Balázsi, G., and **Zeng, L.**, “Cell Fate Decisions Emerge as Phages Cooperate or Compete inside their Host”, *Nature Communications* 8, 14341 (2017) PMID: 28165024, PMCID: PMC5303824

Highlighted in Natural History Magazine, Samplings section (2017)

News coverage: Texas A&M AgriLife Today, ScienceDaily, Phys.org, EurekAlert, Johns-Hopkins News-Letter, Science and Life Russia, Medindia, Latinos Health, Infection Control Today, Newswise, Feedstuffs (2017)

Shao, Q., Trinh, J.T., McIntosh, C.S., Christenson, B., Balázsi, G., and **Zeng, L.**, “Lysis-lysogeny Coexistence: Prophage Integration during Lytic Development”, *Microbiologyopen* 6(1) (2016) PMID: 27530202, PMCID: PMC5300877

Fan, X., Duan, X., Huang Q., Zhou, M., Wang, H., **Zeng, L.**, Young, R., and Xie, J., “the Global Reciprocal Reprogramming between Mycobacteriophage SWU1 and Mycobacterium Reveals the Molecular Strategy of Subversion and Promotion of Phage Infection”, *Frontiers in Microbiology* 7, 41 (2016) PMID: 26858712, PMCID: PMC4729954

Shao, Q., Hawkins, A., and **Zeng, L.**, “Phage DNA Dynamics in Cells with Different Fates”, *Biophysical Journal* 108, 2048-2060 (2015) PMID: 25902444, PMCID: PMC4407255

Fan, X., Yan, J., Xie, L., **Zeng, L.**, Young, R., and Xie, J., “Genomic and Proteomic Analyses of Mycobacteriophage SWU1 Isolated from China Soil”, *Gene* 561, 45-53 (2015) PMID: 25701596, PMCID: PMC5066301

**Zeng, L.\*** and Golding, I., “Following Cell-fate in *E. coli* after Infection by Phage Lambda”, *Journal of Visualized Experiments* 56, e3363, DOI: 10.3791/3363 (2011) **\*Corresponding author** PMID: 22025187, PMCID: PMC3227188

Rothenberg, E., Sepulveda, L.A., Skinner, S.O., **Zeng, L.**, Selvin, P.R., and Golding, I., “Single-virus Tracking Reveals a Spatial Receptor-Dependent Search Mechanism”, *Biophysical Journal* 100, 2875-2882 (2011) PMID: 21689520, PMCID: PMC3123979

**Zeng, L.**, Skinner, S.O., Sippy, J., Feiss, M., and Golding, I., “Decision Making at a Subcellular Level Determines the Outcome of Bacteriophage Infection”, *Cell* 141(4), 682-691 (2010) PMID: 20478257, PMCID: PMC2873970

Nature Research Highlights: “Cell biology: Viral Vote” *Nature* 465, 271 (2010)

**Zeng, L.**, Balachandar, S., Najjar, F., and Fischer, P., “Wake Response of a Finite-sized Particle in a Turbulent Channel Flow”, *International Journal of Multiphase Flows* 36, 406-422 (2010)

**Zeng, L.**, Najjar, F., Balachandar, S., and Fischer, P., “Forces on a Finite-sized Particle Located Close to a Wall in a Linear Shear Flow”, *Physics of Fluids* 21, 033302 (2009)

**Zeng, L.**, Balachandar, S., Fischer, P., and Najjar, F., “Interactions of a Stationary Finite-sized Particle with Wall Turbulence”, *Journal of Fluid Mechanics* 594, 271-305 (2008)

**Zeng, L.**, Balachandar, S., and Fischer, P., “Wall-induced Forces on a Rigid Sphere at Finite Re”, *Journal of Fluid Mechanics* 536, 1-25 (2005)

**Zeng, L.** and Wu, S., “The Background Function for Generation of Unstructured Grids”, *Journal of Beijing University of Aeronautics and Astronautics* 3(8), (2002)

## RESEACH SUPPORT

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### ONGOING

National Institutes of Health (R01GM107597) **Zeng (PI)**, Balazsi (MPI) 04/01/2015 – 03/31/2019  
“Integration of Diverse Inputs Determines Developmental Outcomes”

The focus of this project is to elucidate the underlying mechanism for lysis-lysogeny decision making in *E. coli* upon infection by phage lambda, a paradigmatic system for cell-fate determination and developmental genetic networks.

TAMU Neuhaus-Shepardson Faculty Development Grant **Zeng (PI)** 11/20/2017 – 08/31/2018

### PENDING

National Science Foundation (1818299) **Zeng (co-PI)**, Zhang (PI), Hu (co-PI) 06/01/2018 – 05/31/2021  
“Molecular Mechanism for Genomic RNA Delivery in ssRNA Phages”

The focus of this project is to elucidate the underlying mechanism of how the ssRNA phage MS2 genomic RNA enters the host by combining cyro-EM, cyro-ET and fluorescence microscopy and computational modeling.