

# SARAH YEON-KYOUNG KIM

Duke University, Department of Biomedical Engineering, CIEMAS 3309, 101 Science Dr., Durham, NC 27708  
Email: sarahkim317@gmail.com, Phone: 623-695-4726

## EDUCATION

- Postdoctoral Associate in Biomedical Engineering, Duke University Nov 2019-Present  
*Advisor:* Ashutosh Chilkoti, Ph.D.
- Ph.D. in Molecular Biophysics, Johns Hopkins University Aug 2013-Oct 2019  
*Thesis Title:* “Discovery and Characterization of pH-Sensitive, Membrane Active Peptides”  
*Advisor:* Kalina Hristova, Ph. D.
- B.A. in Chemistry and Biology (*Magna Cum Laude*), Cornell University Aug 2009-May 2013  
*Thesis Title:* “A Steady-State Fluorescence Spectrometry Method for Quantifying Partitioning Between Lo and Ld Phases in Multi-Lamellar Vesicles”  
*Advisor:* Gerald Feigenson, Ph.D.

## RESEARCH INTERESTS

Drug delivery, biomaterials, membrane biophysics, synthetic biology, elastin-like polypeptides, membrane active peptides, high-throughput screens, green chemistry.

## TEACHING EXPERIENCE

### **Bard College, Annandale-on-Hudson, NY**

*Faculty*, Citizen Science Program July 2022-January 2023

### **Duke University, Durham, NC**

*Participant*, Teaching Writing in the Disciplines Certificate Program Fall 2022-Spring 2023  
*Fellow*, Preparing Future Faculty Program. Fall 2021-Spring 2022

### **Johns Hopkins University, Maryland, MD**

*Guest Instructor*, Biomaterials Lab. Instructor: K. Hristova Spring 2015, 2016, 2017, 2018, 2019  
*Guest Instructor*, Intro to Biophysical Methods, Instructor: Elmer A. Zapata-Mercado Fall 2018  
*Participant*, Preparing Future Faculty Certificate Program 2016-2018  
*Instructor*, Life-A Matter of Fat. Hopkins Engineering Applications & Research Tutorials Fall 2017  
*Fellow*, Collaborative Teaching Fellows Program 2016  
*Guest Lecturer*, Biomolecular Materials I. Instructor: K. Hristova Fall 2015 and 2016  
*Teaching Assistant*, Proteins and Nucleic Acids. Instructors: G. Bowman and S. Woodson Fall 2014

### **Baltimore Under Ground Science Space (BUGSS)**

*Instructor*, Molecular Biology Bootcamp: Building a Kill-Switch in Bacteria. Nov 2016

## STUDENTS MENTORED

Matthew Wang, Chilkoti Lab, undergraduate researcher, Duke University	Sept 2022-May 2023
Jocoe Kerschen, Chilkoti Lab, Amgen Scholar, Duke University	Summer 2022
Taylor Devlin, Hristova Lab, rotation student, Johns Hopkins University	Spring 2019
Sijia Li, Hristova Lab, undergraduate researcher, Johns Hopkins University	2014-2017
Elmer Zapata Mercado, Hristova Lab, rotation student, Johns Hopkins University	Spring 2016
Prathik Naidu, Ulmschneider Lab, high school student, Johns Hopkins University	Summer 2015
Dakota He, Hristova Lab, high school student, Johns Hopkins University	2014-2015

## PUBLICATIONS

Undergraduate co-authors are underlined.

- Wiedman, G., **Kim, S.Y.**, Zapata-Mercado, E., Wimley, W.C. and Hristova, K., 2017. pH-triggered, macromolecule-sized poration of lipid bilayers by synthetically evolved peptides. *J. Am. Chem. Soc.*, 139(2), pp.937-945.
- Li, S., **Kim, S.Y.**, Pittman, A.E., King, G.M., Wimley, W.C. and Hristova, K., 2018. Potent Macromolecule-sized poration of lipid bilayers by the macrolittins, a synthetically evolved family of pore-forming peptides. *J. Am. Chem. Soc.*, 140(20), pp.6441-6447.
- Kim, S.Y.**, Pittman, A.E., Zapata-Mercado, E., King, G.M., Hristova, K., and Wimley, W.C., 2019. Mechanism of action of peptides that cause pH-triggered macromolecular poration of lipid bilayers. *J. Am. Chem. Soc.*, 141 (16), pp 6706–6718.
- Paredes, S.D., **Kim, S.**, Rooney, M.T., Greenwood, A.I., Hristova, K. and Cotten, M.L., 2020. Enhancing the membrane activity of Piscidin 1 through peptide metallation and the presence of oxidized lipid species: Implications for the unification of host defense mechanisms at lipid membranes. *Biochim. Biophys. Acta-Biomembranes*, 1862(7), p.183236.
- Kim, S.Y.**, Bondar, A.N., Wimley, W.C. and Hristova, K., 2021. pH-triggered pore-forming peptides with strong composition-dependent membrane selectivity. *Biophys. J.*, 120(4), pp.618-630.
- Guha, S., Ferrie, R.P., Ghimire, J., Ventura, C.R., Wu, E., Sun, L., **Kim, S.Y.**, Wiedman, G.R., Hristova, K. and Wimley, W.C., 2021. Applications and evolution of melittin, the quintessential membrane active peptide. *Biochem. Pharmacol.*, 193, p.114769.
- Kelly, G., Milligan, J.J., Mastria, E.M., Kim, S., Zelenetz, S.R., Dobbins, J., Cai, L.Y., Li, X., Nair, **Kim, S.Y.** and Chilkoti, A., 2022. Intratumoral delivery of brachytherapy and immunotherapy by a thermally triggered polypeptide depot. *J. Controlled Release*, 343, pp.267-276.
- Saha, S. Banskota, S., Liu, J., Zakharov, N., Dzuricky, M., Li, X., Fan, P., Deshpande, S., Spasojevic, I., Sharma, K., Borgnia, M., Schaal, J.L., Raman, A., **Kim, S.Y.**, Bhattacharyya, J., Chilkoti, A., 2022. Genetically Engineered Nanoparticles of Asymmetric Triblock Polypeptide with a Platinum(IV) Cargo Outperforms a Platinum(II) Analog and Free Drug in a Murine Cancer Model. *Nano Lett.*

## RESEARCH GRANTS

### Completed Grants

#### **Duke-Coulter Translational Partnership**

9/1/2021-8/31/2022

Title: “Development of a genetically-engineered injectable drug depot of panobinostat for the treatment of high-grade pediatric brain tumors through convection enhanced delivery (CED)”

PIs: David Ashley, Ph.D.; Soumen Saha, Ph.D.

Amount: \$174,336

Duke University

Role: I helped write and revise the grant, as well as develop and test drug formulations.

#### Pending Grants

##### **Future Manufacturing National Science Foundation Grant**

submitted May 2022

Title: "FMRG: Bio: Scalable Continuous Manufacturing of Viral Vectors"

PIs: Ashutosh Chilkoti, Ph.D., Charles A. Gersbach, Ph.D., Micelle Sabaoun, MS, Aravind Asokan, Ph.D.

Amount: \$3 million

Duke University and Alamance Community College

Role: Co-author.

#### **CONFERENCE PARTICIPATION**

##### **Biophysical Society Annual Meeting**, Baltimore, MD

March 2019

Poster: *Mechanism of Action of pH-Triggered, Membrane Active Peptides*

##### **Biophysical Society Annual Meeting**, San Francisco, CA

Feb 2018

Presentation: *Mechanism of Action of pH-triggered, Membrane Active Peptides: Effect of Lipid Composition*

##### **Membrane Protein Folding Gordon Research Conference**, Easton, MA

June 2017

Poster: *Mechanism of Action of pH-triggered, macromolecular pore-forming peptides for endosomal escape.*

##### **Delaware Membrane Protein Symposium**, Newark, DE

May 2017

Poster: *Mechanism of Action of pH-triggered, macromolecular pore-forming peptides for endosomal escape.*

##### **Biophysical Society Annual Meeting**, New Orleans, LA

Feb 2017

Poster: *Mechanism of Action of pH-triggered, macromolecular pore-forming peptides for endosomal escape.*

##### **Delaware Membrane Protein Symposium**, Newark, DE

April 2016

Poster: *Design of pH-triggered, macromolecular pore-forming peptides for endosomal escape.*

##### **Biophysical Society Annual Meeting**, Los Angeles, CA

Feb 2016

Poster: *Design of pH-triggered, macromolecular pore-forming peptides for endosomal escape.*

##### **Northeast Conference for Undergraduate Women in Physics**, Ithaca, NY

Jan 2013

Presentation: *Measuring the partitioning of lissamine rhodamine-DOPE in the four component model membrane system DSPC/DOPC/POPC/Chol.*

#### **CAMPUS OR DEPARTMENTAL TALKS**

##### **2019 JHU Nano-Bio Symposium: Translation of Nano & Bio Research**, Baltimore, MD

May 2019

Poster: *Mechanism of Action of pH-Triggered, Membrane Active Peptides*

##### **Women in STEM Symposium**, Baltimore, MD

April 2019

Poster: *Mechanism of Action of pH-Triggered, Membrane Active Peptides*

- Institute for Biophysical Research Annual Retreat**, Baltimore, MD Sep 2018  
Presentation: *Mechanism of Action of pH-Triggered, Membrane Active Peptides*
- 2018 JHU Nano-Bio Symposium: Advanced Biomanufacturing**, Baltimore, MD May 2018  
Poster: *Mechanism of Action of pH-triggered, macromolecular pore-forming peptides for endosomal escape.*
- Institute for Nanobiotechnology Graduate Mini Symposium**, Baltimore, MD Feb 2018  
Presentation: *Mechanism of Action of pH-Triggered, Membrane Active Peptides: Effect of Negative Charge.*
- Institute for Biophysical Research Annual Retreat**, Baltimore, MD Sep 2017  
Poster: *Mechanism of Action of pH-triggered, macromolecular pore-forming peptides for endosomal escape.*
- 2017 JHU Nano-Bio Symposium: Engineering Vascularization** May 2017  
Poster: *Mechanism of Action of pH-triggered, macromolecular pore-forming peptides for endosomal escape.*
- Program of Molecular Biophysics, Student Evening Series**, Baltimore, MD Nov 2016  
Presentation: *Mechanism of Action of pH Triggered, Membrane Active Peptides*
- Institute for Biophysical Research Annual Retreat**, Baltimore, MD Sep 2016  
Poster: *Design of pH-triggered, macromolecular pore-forming peptides for endosomal escape.*
- Institute for Nanobiotechnology Graduate Mini Symposium**, Baltimore, MD Mar 2016  
Presentation: *Design of pH-triggered, macromolecular pore-forming peptides for endosomal escape.*
- Institute for Biophysical Research Annual Retreat**, Baltimore, MD Sep 2015  
Poster: *Designing pH-sensitive membrane pore forming peptides for endosomal escape.*

## PATENT

Wimley, W.C., Wiedman, G., Hristova, K., **Kim, S.Y.** “pH-Triggered, Macromolecule-Sized Poration of Lipid Bilayers by Synthetically Evolved Peptides.” Patent Application No. 62433109, December 12, 2016.

## HONORS AND AWARDS

- 3 Minute Thesis Competition, Finalist April 2019
- Women in STEM Symposium, 1st Place Graduate Student Poster Award April 2019
- 2018 JHU Nano-Bio Symposium: Advanced Manufacturing, 3rd in People’s Choice Poster Presentation Award May 2018
- 2017 JHU Nano-Bio Symposium: Engineering Vascularization, 2nd in Poster Competition May 2017
- Biophysical Society Student Research Achievement Award, Poster Competition Feb 2017
- Biophysical Society Student Research Achievement Award, Poster Competition Feb 2016
- Carlson Fellowship, Thomas C. Jenkins Department of Biophysics 2013-2015

**COMMUNITY INVOLVEMENT AND OUTREACH**

*ESOL Instructor, Durham Literacy Center, Durham, NC*

*Volunteer Tutor, Dyslexia Tutoring Program, Baltimore, MD*

*Mentor, STEM Achievement in Baltimore Elementary Schools*

*Volunteer, Q?rius, Smithsonian National Museum of Natural History*

*Mentor, Women in Science and Engineering Program*

Spring 2020-present

Nov 2016-May 2019

Sep 2014-June 2017

Mar 2015-Aug 2016

Dec. 2014-May 2015

**PROFESSIONAL MEMBERSHIPS**

Biophysical Society

2014-2020