

**Joanna S.G. Slusky**  
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## Appointments

### **University of Kansas**

Associate Professor of Molecular Biosciences	2020 – present
Associate Professor of Computational Biology	2020 – present
Docking Family Scholar	2017 – present
Assistant Professor of Molecular Biosciences	2014 – 2020
Assistant Professor of Computational Biology	2014 – 2020

## Academic training

### **Postdoctoral Fellow**

Advisor: Roland L. Dunbrack Jr. Fox Chase Cancer Center: Institute for Cancer Research NIH postdoctoral research training grant	2012 – 2014
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### **Postdoctoral Fellow**

Advisor: Gunnar von Heijne Stockholm University: Biochemistry and Biophysics Human Frontier Science Program postdoctoral fellow	2008 – 2012
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### **Ph.D. in Biochemistry and Biophysics, University of Pennsylvania**

Advisor: William F. DeGrado NSF Graduate Research Fellow	Dec. 2007
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### **A.B. in Chemistry, *Magna Cum Laude*. Princeton University**

Advisor: Robert J. Cava Minor in Material Science and Engineering.	May 2001
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## Manuscripts under review`

1. S.J. Budiardjo, J. Stevens, A. Caulkins, A.P. Ikujuni, V. Wimalasena, E. Firlar, D.A. Case, J.S. Biteen, J.T. Kaelber, **J.S.G. Slusky**, “Colicin E1 opens its hinge to plug TolC”. *Submitted 2019* [[BioRxiv](#)]
2. M.W. Franklin, J.J. Stevens, J. Krise, **J.S.G. Slusky**, “The Extracellular Loops of OmpA Control the Slow Rate of *In Vitro* Folding”. *Submitted 2020* [[BioRxiv](#)]
3. R. Feehan\*, D. Montezano\*, **J.S.G Slusky**, “Machine Learning for Enzyme Engineering, Selection, and Design”. *Submitted 2020* [\*co-first authors] [[manuscript](#)]

## Peer-Reviewed Publications

4. R. Feehan\* M.W. Franklin\*, **J.S.G. Slusky**, “Machine Learning Differentiates Enzymatic and Non-Enzymatic Metals in Proteins”. Accepted at *Nature Communications* (2021) [\*co-first authors] [[BioRxiv](#)]

5. R. Dhar, R. Feehan, **J.S.G. Slusky**. “Membrane Barrels Are Taller, Fatter, Inside-Out Soluble Barrels”. *Journal of Physical Chemistry B* (2021) [[JoPCB](#)]
6. S.J. Budiardjo\*, A.I. Ikujuni\*, E. Firlar, A. Cordova, J.T. Kaelber, **J.S.G. Slusky**, “High Yield Preparation of Outer-Membrane Protein Efflux Pumps by *In Vitro* Refolding is Concentration Dependent. *Journal of Membrane Biology* (2021) [\*co-first authors] [[JMBi](#)]
7. R. Dhar, **J.S.G. Slusky**. “Outer Membrane Protein Evolution.” *Current Opinion in Structural Biology* (2021) [[CurOpStructBio](#)]
8. Tan, S.K., Fong, K.P., Polizzi, N.F., Sternisha, A., **Slusky, J.S.G.**, Yoon, K., Degrado, W.F., Bennett, J.S. “Modulating Integrin  $\alpha$ IIb $\beta$ 3 Activity through Mutagenesis of Allosterically Regulated Inter-subunit Contacts” *Biochemistry* 58, 3251–3259 (2019) [[Biochemistry](#)]
9. M.W. Franklin, S. N. Nepomnyachiy, R. Feehan, N. Ben-Tal, R. Kolodny, **J.S.G. Slusky**. “Evolutionary pathways of repeat protein topology in bacterial outer membrane proteins” *eLife* 7:e40308 (2018) [[eLife](#)] [[eLife Insight](#)]
10. M.W. Franklin, S. N. Nepomnyachiy, R. Feehan, N. Ben-Tal, R. Kolodny, **J.S.G. Slusky**. “Efflux Pumps Represent Possible Evolutionary Convergence onto the Beta Barrel Fold” *Structure* 26(9):1266-74 (2018) [[Structure](#)] [[very good by F1000](#)] [[cover image Sept 2018](#)]
11. M.W. Franklin, **J.S.G. Slusky**. “Tight Turns of Outer Membrane Beta-Barrels: An Analysis of Sequence, Structure, and Hydrogen Bonding” *Journal of Molecular Biology* 430(18B):3251-65 (2018) [[JMB](#)]
12. **Slusky, J.S.G.** “Outer membrane protein design.” *Current Opinion in Structural Biology* 54:45-52 (2017) [[CurrOpStructBio](#)]
13. Kim, S., Patel, D.S., Park, S., **Slusky, J.S.G.**, Klauda, J.B., Widmalm, G., & Im, W. “Bilayer Properties of Lipid A from Various Gram-Negative Bacteria”. *Biophysical Journal* 111(8):1750-60 (2016) [[BJ](#)]
14. **J.S.G. Slusky\*** and R.L. Dunbrack. “Charge asymmetry in proteins of the outer membrane.” *Bioinformatics* 29(17):2122-8 (2013) \***corresponding author** [[Bioinformatics](#)]
15. P. Lloris-Garcerá, S. Seppälä, **J.S.G. Slusky**, M. Rapp, G. von Heijne. “Why Have Small Multidrug Resistance Proteins Not Evolved into Fused, Internally Duplicated Structures?” *Journal of Molecular Biology* 426(11):2246-54 (2014) [[JMB](#)]
16. P. Lloris-Garcerá, **J.S.G. Slusky**, S. Seppälä, M. Prieß, L. V. Schäfer, G.von Heijne. “In vivo Trp-scanning of the Small Multidrug Resistance protein EmrE confirms anti-parallel 3D structure models.” *Journal of Molecular Biology* 425(22):4642-51 (2013) [[JMB](#)]
17. P. Lloris-Garcerá, F. Bianchi, **J.S.G. Slusky**, S. Seppälä, D.O. Daley, G.von Heijne. “Antiparallel dimers of the small multidrug-resistance protein EmrE are more stable than parallel dimers.” *Journal of Biological Chemistry* 287(31):26052-9 (2012) [[JBC](#)]
18. S.E. Dutton, E.D. Hanson, C.L. Broholm, **J.S. Slusky**, R.J Cava. “Magnetic properties of hole-doped SCGO, SrCr(8)Ga(4-x)M(x)O(19) (M=Zn, Mg, Cu).” *Journal of physics-- Condensed matter*, 23(38):386001, (2011) [[JoP:CM](#)]
19. S. Seppälä, **J.S. Slusky**, P. Lloris-Garcerá, M. Rapp, G.von Heijne. “Control of membrane protein topology by a single C-terminal residue.” *Science* 328(5986):1698-700, (2010). [[Science](#)]
20. **J.S. Slusky**, H. Yin, W.F. DeGrado “Understanding membrane proteins: How to design inhibitors of transmembrane protein-protein interactions.” *Protein Engineering* (C. Köhler, U.L. RajBhandary; Ed.), Springer Verlag, 22, 315-338 (2009). [[Springer](#)]

21. H. Yin\*, **J.S. Slusky\***, B.W. Berger, R.S. Walters, G. Vilaire, R.I. Litvinov, J. D. Lear, G.A. Caputo, J.S. Bennett, W.F. DeGrado. “Computational Design of Peptides that Target Transmembrane Helices” *Science* 315(5820):1817 (2007) \*co-first authors [[Science](#)]
22. J. Snyder, B.G Ueland, **J.S. Slusky**, H. Karunadasa, R.J.Cava, P. Schiffer. “Low-temperature spin freezing in the Dy<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub> spin ice.” *Physical Review B: Condensed Matter and Materials Physics* 69(6):064414, (2004) [[PRB](#)]
23. J. Snyder, B.G. Ueland, A. Mizel, **J.S. Slusky**, H. Karunadasa, R.J. Cava, P. Schiffer. “Quantum and thermal spin relaxation in the diluted spin ice Dy<sub>2-x</sub>M<sub>x</sub>Ti<sub>2</sub>O<sub>7</sub> (M=Lu,Y).” *Physical Review B: Condensed Matter and Materials Physics* 70(18):184431, (2004). [[PRB](#)]
24. T.W. Heitmann, S.D. Bu, D.H. Kim., J.H. Choi, J. Giencke, C.B. Eom, K.A. Regan, N. Rogado, M.A. Hayward, T. He, **J.S. Slusky**, P. Khalifah, M. Haas, R.J. Cava, D.C. Larbalestier, M.S. Rzchowski. “MgB<sub>2</sub> energy gap determination by scanning tunnelling spectroscopy.” *Superconductor Science & Technology: Suppl S.* 17(2):237, (2004). [[SS&T](#)]
25. J. Snyder, B.G. Ueland, **J.S. Slusky**, H. Karunadasa, R.J.Cava, A. Mizel, P. Schiffer, “Quantum-classical reentrant relaxation crossover in Dy<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub> spin ice.” *Physical Review Letters* 91(10):107201, (2003). [[PRL](#)]
26. J. Snyder, J.S. Slusky, R.J. Cava, P.Schiffer, “Dirty spin ice: The effect of dilution on spin freezing in Dy<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub>.” *Physical Review B: Condensed Matter and Materials Physics* 66(6):064432, (2002). [[PRB](#)]
27. **J. S. Slusky**, N. Rogado, K. A. Regan, M. A. Hayward, P. Khalifah, T. He, Inumaru, S. M. Loureiro, M. K. Haas, H. W. Zandbergen, R. J. Cava. “Loss of superconductivity with the addition of Al to MgB<sub>2</sub> and a structural transition in Mg<sub>1-x</sub>Al<sub>x</sub>B<sub>2</sub>.” *Nature* 410(4826):343-5, (2001). [[Nature](#)]
28. J. Snyder, **J.S. Slusky**, R.J. Cava, P. Schiffer. “How ‘spin ice’ freezes.” *Nature* 413(6851):48-51, (2001). [[Nature](#)]
29. D.C. Larbalestier, L.D. Coolye, M.O. Rikel, A.A. Polyanskii, J. Jiang, S. Patnaik, X.Y. Cai, D.M. Feldmann, A Gurevich, AA Squirieri, M.T. Naus, C. B. Eom, E.E. Hellstrom, R. J. Cava, K. A. Regan, N. Rogado, M.A. Hayward, T. He, **J.S. Slusky**, P. Khalifah, K. Inumaru, M. Haas. “Strongly linked current flow in polycrystalline forms of the superconductor MgB<sub>2</sub>.” *Nature* 410(6825):186-9, (2001). [[Nature](#)]
30. C.B. Eom, M.K. Lee, J.H. Choi, L. Belenky, X. Song, L.D. Cooley, M.T. Naus, S. Patnaik, J. Jiang, M. Rikel, A. Polyanskii, A. Gurevich, X.Y. Cai, S.D. Bu, S.E. Babcock, E.E. Hellstrom, D.C. Larbalestier, N. Rogado, K.A. Regan, M.A. Hayward, T. He, **J.S. Slusky**, K. Inumaru, M.K. Haas, R.J. Cava. “High critical current density and enhanced irreversibility field in superconducting MgB<sub>2</sub> thin films.” *Nature* 411(6837):558-60, (2001). [[Nature](#)]
31. T. He, Q. Huang, A.P. Ramirez, Y. Wang, K.A. Regan, N. Rogado, M.A. Hayward, M.K. Haas, **J.S. Slusky**, K. Inumara, H.W. Zandbergen, N.P. Ong, and R.J. Cava. “Superconductivity in the non-oxide perovskite MgCNi<sub>3</sub>.” *Nature* 411(6833):54-6 (2001). [[Nature](#)]
32. T. Yildirim, O. Gulseren, J.W. Lynn, C.M. Brown, T.J. Udovic, Q. Huang, N. Rogado, K.A. Regan, M.A. Hayward, **J.S. Slusky**, T.He, M.K. Haas, P. Kalifah, K. Inumaru, and R.J. Cava. “Giant anharmonicity and nonlinear electron-phonon coupling in MgB<sub>2</sub>: a combined first-principles calculation and neutron scattering study.” *Physical Review Letters* 87(3):037001, (2001). [[PRL](#)]

## Patents and patents under review

1. **J.S. Slusky**, H. Yin, W.F. DeGrado. “Polypeptides That Bind Membrane Proteins.” United States Patent. US 2010-0120695-A1 (2010). [[GooglePatents](#)]
2. **J.S.G. Slusky** “Targeting the formation of Beta Barrels”. United States Patent Application 1549605. Filing date: 4/27/2017

## Awards

- Johnson and Johnson STEM2D Scholars Award, Finalist (2019)
- Sigma Xi Student Invited Outstanding Scientist Award, Kansas State University (2018)
- NIH Director’s New Innovator Award (2017)
- Moore Inventor Fellowship (2016)
- F1000 Outstanding Presentation Prize 3Dsig (2016)
- University of Pennsylvania: Biomedical Graduate Studies Director’s Award (2002)
- Princeton University: Malcolm H. Chisholm prize for student who displayed the most excellence in inorganic chemistry in the class of 2001
- Semifinalist Westinghouse Science Talent Search (1997)

## Major Fellowships and Grants

NIH DP2 GM128201                      Slusky (PI)    09/30/17-05/30/22  
Designed Beta-Strands for Inhibiting Efflux Pumps and Disabling Antibiotic Resistance  
Role: PI    direct costs:    \$1,500,000

Moore Inventor Fellowship                      Slusky (PI)    11/01/17-12/31/19  
Peptides That Bind To Outer Membrane Beta Barrels  
Role: PI    direct costs:    \$750,000

NIH P20GM113117                      Slusky (Junior Investigator)    08/28/16-05/01/17  
This CoBRE award for Chemical Biology of Infectious Diseases funds multiple projects in Kansas.  
Targeting TolC oligomerization to potentiate antibiotics  
Role: Project PI    direct costs for Slusky lab:    \$140,000

NIH P20GM103418                      Slusky(Project Award)    05/01/16-08/27/16  
This Kansas-INBRE award funds research within the theme of cell and developmental biology  
Targeting TolC oligomerization to potentiate antibiotics  
Role: Development Project Research Grant    direct costs for Slusky lab:    \$75,000

—*Before arriving at KU in summer 2014*—

- NIH postdoctoral research training grant (2012-2014)
- HFSP (Human Frontier Science Program) Long Term Research Fellow (2008-2011)
- NIH Structural Biology Training Grant (2005-2007)
- NSF Graduate Research Fellowship (2002-2005)
- New Jersey Commission on Cancer Research, Summer Fellow (1997)

## **Talks and Invited Seminars:**

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- Invited Seminar: Lehigh University Chemistry Department, Lehigh, PA via Zoom (April 2021)
- Invited Speaker: Bacterial Cell Envelopes: Structure, Dynamics, and Function, Southampton, UK (March 2021)
- PEDS: Protein Engineering Design and Selection Webinar series (September 2020) [[youtube 7:00-32:00](#)]
- Translocation Transfer Seminar Series, Bremen, Germany via Zoom (Aug. 2020)
- Accepted presentation: International Society for Computational Biology (ISCB) international meeting 3DSig (structural biology track) Zoom (July 2020)
- Invited Seminar: Rutgers University Center for Advancement of Bio-Medicine Piscataway, NJ (February 2020)
- Invited Seminar: NIH NIDDK, Bethesda, MD (January 2020)
- Invited Speaker: Midwest Regional Meeting of American Chemical Society, Wichita, KS (October 2019)
- Invited Seminar: Rutgers University Chemistry Department, Piscataway, NJ (September 2019)
- Selected Speaker: RosettaCON, Leavenworth, WA (August 2019)
- Invited Speaker: GRC Membrane Protein Folding, Easton, MA (July 2019)
- Invited Seminar: NIH membrane interest group, Bethesda, MD (March 2019)
- Invited Seminar: University of Wisconsin Madison, Biochemistry Colloquium, Madison, WI (February, 2019)
- Keynote Speaker: How Did Proteins Emerge and Continue to Evolve Meeting, Haifa, Israel (February 2019)
- Invited Seminar: Physics Seminar Series, University of Missouri, Columbia, MO (February 2019)
- Invited Speaker: Modeling of Protein Interactions, Lawrence, KS (November 2018)
- Invited Seminar: Chemical and Structural Biology and Biophysics Research Series, The Ohio State University, Columbus, OH (October 2018)
- Invited Speaker: Protein Design and Engineering conference, Frankfurt, Germany (October 2018)
- Invited Seminar: Vanderbilt Structural Biology symposium, Nashville, TN (September 2018)
- Invited Speaker: EMBO workshop mPEPC1 Hamburg, Germany (September 2018)
- Selected Speaker: Protein Society Annual Symposium, Boston, MA (July 2018)
- Student Invited Speaker: Sigma Xi, Scientific Research Society, Manhattan, KS (April 2018)
- Invited Speaker: Eclipse Symposium on Membrane Proteins, Manhattan KS (August 2017)
- Invited Speaker: Workshop: Structural biology Stockholm, Sweden (January 2017)
- Invited Speaker: Modeling of Protein Interactions, Lawrence, KS (October 2016)
- Selected Speaker: FASEB: Molecular Biophysics of Membranes, Snowmass, CO (July 2016)
- Invited Seminar: Rutgers University, Piscataway, NJ (June 2016)
- Invited Seminar: University of Missouri, Kansas City, Kansas City, MO (November 2015)
- Invited Speaker: GRC Membrane Protein Folding, Waltham, MA (June 2015)
- Invited Seminar: Stockholm University, Stockholm, Sweden (June 2015)
- Invited Seminar: University of Kansas Medical Center, Kansas City, KS (December 2014)
- Invited Seminar: Kansas State, Manhattan, Kansas (November 2014)
- Invited Speaker: Modeling of Protein Interactions, Lawrence, KS (October 2014)

## **Teaching (all classes are co-taught)**

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### **Classes:**

BIOL 636 Introduction to Biochemistry I	Fall, 2015 – present
BINF 701 Computational Biology Core Course I	Fall, 2015 – 2017, 2019 – present
BINF 702 Computational Biology Core Course II	Spring, 2016 – present
BINF 709 Topics in Bioinformatics	Fall & Spring, 2015 – present
BIOL 750 Graduate Advanced Biochemistry	Spring, 2016 – present

### **Postdoctoral Fellows:**

Huisun Lee	2016 – 2017
Pinakin Sukthankar	2015 – 2019
Daniel Montezano	2019 – present
Jimmy Budiardjo	2019 – present

### **Graduate Students:**

Meghan Franklin	2015 – 2019
Jaden Anderson	2016 – 2021
Rik Dhar	2016 – present
S. Jimmy Budiardjo	2017 – 2019
Paul Ikujuni	2019 – present
Ryan Feehan	2019 – present
Samuel Lim	2021 – present

### **Post Baccalaureate Students:**

Aldo Salazar Morales	2017 – 2018
Dennis Perez-Lopez	2018 – 2019

### **Undergraduate Students:**

Shannon James	2014 – 2016
Ryan Feehan	2015 – 2017
Cedric Clark	2015 – 2017
Aleksander Downs	2015 – 2018
Paul Goodman III	Summer 2015
Riel Latimer	2016 – 2017
Virangika Wimalasena	2017 – 2018
Brooke Wietharn	2018 – 2019
Gustavo Murillo-Espinoza	2018 – present
Jenna Gardener	2019 – 2020
Andres Cordova	2020 – present
Justin Lerma	Summer 2020
Sarah Noga	2020 – present

### **High School Students:**

Arrihant Kanna	summer 2017
Rebecca Bernstein	2020 – present

## Graduate Committees:

### *Past:*

1. Xi Cheng, Computational Biology, 2015
2. Ragul Gowthaman, Computational Biology, 2015
3. Varsha Badal, Computational Biology, 2015 – 2018
4. Savely Belkin, Computational Biology, 2015 – 2019
5. Shipra Malhotra, Computational Biology 2015 – 2019
6. Jittasak Khowsathit, Computational Biology 2015 – 2019
7. Jiaqin Li, Molecular Biosciences, 2016
8. Jumin Lee, Computational Biology 2016 – 2017
9. Elizabeth Grotemeyer, Molecular Biosciences 2016 – 2018
10. Sijin Ren, Chemistry, 2017
11. Shoichi Tachiyama, Molecular Biosciences, 2018 – 2019
12. Nikola Kenjic, Molecular Biosciences 2015 – 2019
13. Nan Bai, Molecular Biosciences, 2015 – 2019
14. Victor Vasquez Montes, Biochemistry and Molecular Biology at KUMC, 2015 – 2020

### *Current:*

1. Dwight Deay, Molecular Biosciences, 2015 – present
2. Pallavi Guha Biswas, Molecular Biosciences 2016 – present
3. Anupama Kante, Molecular Biosciences 2016 – present
4. Pushpa Itagi, Computational Biology, 2016 – present
5. Huijing Wang, Computational Biology, 2016 – present
6. Nathan Jenkins, Computational Biology, 2017 – present
7. GW McElfresh, Computational Biology, 2017 – present
8. Alexander Bowman, Molecular Biosciences, 2017 – present
9. Amritangshu Chakravarty, Molecular Biosciences, 2017 – present
10. Anna Clompen, Ecology and Evolutionary Biology, 2018 – present
11. Ian Kotthoff, Computational Biology, 2019 – present
12. Apurba Bhattarai, Computational Biology, 2020 – present

## Service

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### *Service to the field*

- Nominating committee: Protein Society
- Editorial advisory board: PEDS: *Protein, Engineering, Design, and Selection*
- Co-chairing Biophysical Society Thematic Meeting “Physical and Quantitative Approaches to Overcome Antibiotic Resistance” Stockholm, Sweden (Aug. 2021)
- Associate editor: *Journal of Membrane Biology*
- Guest editor: *PLoS Computational Biology* (4x)
- Rosetta membership committee member
- Journal Reviewer for:

<i>BBA-biomembranes</i>	<i>BMC Structural</i>	<i>Environmental</i>
<i>Biochemistry</i>	<i>Biology</i>	<i>Microbio</i>
<i>Biochimie</i>	<i>Chemical Reviews</i>	<i>Journal of Comp Chem</i>
<i>Biophysical Journal</i>		<i>Molecular BioSystems</i>

*Molecular  
Microbiology  
Oncotarget*

*PLoS Comp Biology  
PNAS  
Proteins*

*Scientific Reports  
Trends in  
Biotechnology*

- Grant reviewer: National Science Centre in Poland

***Promoting Science in High Schools***

- Consultant: Students Modeling A Research Topic (SMART) team, Olathe North, KS, 2017
- Consultant: Olathe North, KS high school for the Science Olympiad, winter 2015
- Presentation: “How to Become a Scientist” to 9<sup>th</sup> graders in Overland Park, KS, April 2018
- Chemistry Demonstration for K-12 STEM fair Overland Park, KS March, 2019