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Me:

I am an experienced researcher with diverse skills in applied and theoretical statistics and machine learning. I am looking for team-based projects that emphasize real-world impact.

Experience:

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| University of Washington Department of Statistics , Seattle, WA | 09/2017 – Present |
| Advisor: Marina Meila | |
| Allen Institute for Brain Science , Seattle, WA | 01/2020 – 12/2020 |
| Supervisor: Stefan Mihalas | |
| Amazon SCOT Forecasting Science , Seattle, WA | 06/2017 – 09/2017 |
| Supervisor: Kari Torkkola | |
| Fred Hutchinson Cancer Research Center , Seattle, WA | 09/2015 – 06/2017 |
| Supervisor: Raphael Gottardo | |
| National Heart Lung and Blood Institute , Bethesda, MD | 07/2013 – 05/2015 |
| Supervisor: Cynthia Dunbar | |

Education:

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| University of Washington , Seattle, WA | 09/2015 – 09/2021 |
| Ph.D. Statistics: Geometric algorithms for parametric unsupervised learning | |
| Committee: Marina Meila, Yen-Chi Chen, Zaid Harchoui, Jim Pfafendner | |
| Columbia University , New York, NY | 09/2009 – 5/2013 |
| B.A. Mathematics: GPA 3.74, Math subject GRE: 80% | |

Selected Publications:

Koelle, S, Zhang H, Chen Y, Meila M. *Manifold coordinates with physical meaning*. NeuRIPs Machine Learning and the Physical Sciences workshop 2019.

Xu J, **Koelle S**, Guttorp P, Wu C, Dunbar CE, Abkowitz JL, Minin VN. *Statistical inference in partially observed stochastic compartmental models with application to cell lineage tracking of in vivo hematopoiesis*. Annals of Applied Statistics 13(4) 2091-2119. 2019.

Koelle SJ, Espinoza DA, Wu C, Xu J, Lu R, Li B, Donahue RE, Dunbar CE. *Quantitative Stability of Hematopoietic Stem and Progenitor Cell Clonal Output in Transplanted Rhesus Macaques*. Blood. 2017 Mar 16;129(11):1448-1457

Wu C, Li B, Lu R, **Koelle SJ**, Yang Y, Jares A, Krouse, AE, Metzger M, Liang F, Lore K, Wu C, Donahue RE, Chen I, Weissman I, Dunbar CE. *Clonal tracking of rhesus macaque hematopoiesis highlights a distinct lineage origin for natural killer cells*. Cell Stem Cell. 2014;14:486–499. 39

Selected preprints/under preparation:

Koelle S, Zhang H, Meila M, Chen, Y. *Manifold coordinates with physical meaning*. Under revision at Journal of Machine Learning Research. Preprint: <https://arxiv.org/abs/1811.11891>

Koelle S*, Zhang H*, Meila M. *Dictionary-based manifold learning*. Submitted to AISTAT2020/ICML2020.

Koelle S, Yuan Z, Meila M. *Gradients²: Embedding-based tangent spaces for gradient estimation*. For submission at NeurIPs 2021.

Koelle S, Whitesell J, Hirokawa K, Zeng H, Meila M, Harris J, Mihalas S. *Modelling the cell-type specific murine connectome*. For submission at Network Neuroscience.

References:

Marina Meila, University of Washington Department of Statistics
Stefan Mihalas, Allen Institute for Brain Science
Cynthia Dunbar, National Heart Lung and Blood Institute

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Other publications/under preparation:

Kilpatrick Z, Lee J, Siegle J, Jia X, **Koelle S**, Arkipov A, Olsen S, Mihalas S.

Distinct organization of functional connectivity along different frequency bands across visual cortical areas. Submitted to Front. Syst. Neurosci.

Espinoza D, Mortlock R, **Koelle S**, Wu C, Dunbar C. *Interrogation of clonal tracking data using barcodetrackR.* Nature Computational Science. Vol 1 pg 280-289. 26 April 2021.

Srivastava S, Truitt L, Wu C, Glaser A, Nolan D, Ginsberg M, Espinoza D, **Koelle S**, Yabe I, Yu KR, Hong S, Seller S, Krouse A, Bonifacino A, Metzger M, Dagur P, Donahue R, Dunbar C, Panch S. *Comparative engraftment and clonality of macaque HSPCs expanded on human umbilical vein endothelial cells versus non-expanded cells.* Molecular Therapy: methods and clinical development. Vol 20 pg. 703-715 12 March 2021

Paulson KG, Voillet V, Perdicchio M, Hunter DS, Wagener FD, Valente WJ, **Koelle SJ**, Church CD, Vandeven N, Thomas H, Colunga AG, McAfee MS, Iyer JG, Yee C, Kulikauskas R, Koelle DM, Pierce RH, Bielas JH, Greenberg PD, Bhatia S, Gottardo R, Nghiem P, Chapuis AG. *Acquired Cancer Resistance to Combination Immunotherapy from Transcriptional Loss of Class I HLA.* Nature Communications 9(1). December 2018

Wu C, Espinoza DA, **Koelle SJ**, Yang D, Truitt L, Schlums H, Lafont BA, Davidson-Moncada JK, Lu R, Kaur A, Hammer Q, Li B, Panch S, Allan DA, Donahue RE, Childs RW, Romagnani C, Bryceson YT, Dunbar CE. *Clonal expansion and compartmentalized maintenance of rhesus macaque NK cell subsets.* Science Immunology. 2018 Nov 2;3(29).

Yabe IM, Truitt LL, Espinoza DA, Wu C, **Koelle S**, Panch S, Corat MAF, Winkler T, Yu KR, Hong SG, Bonifacino A, Krouse A, Metzger M, Donahue RE, Dunbar CE. *Barcoding of Macaque Hematopoietic Stem and Progenitor Cells: A Robust Platform to Assess Vector Genotoxicity.* Mol Ther Methods Clin Dev. 2018 Oct 25

Yu, KR, Espinoza DA, Wu C, Truitt L, Shin TH, Chen S, Fan X, Yabe I, Panch S, Hong SG, **Koelle S**, Lu R, Bonifacino A, Krouse A, Metzger M, Donahue RE, Dunbar CE. *The impact of aging on primate hematopoiesis as interrogated by clonal tracking.* Blood. 2018 Jan 2.

Wu C, Espinoza D, **Koelle S**, Potter EL, Lu R, Li B, Yang D, Fan X, Donahue R, Roederer M, Dunbar CE. *Geographic Clonal Tracking in Macaques Provides Insights into HSPC Migration and Differentiation.* Journal of Experimental Medicine. 2018 Jan 2.

Presentations:

A family of algorithms for interpretable dimension reduction. Information Theory and Applications. San Diego, CA. 2/2020

A family of algorithms for interpretable dimension reduction. Berkeley Data Science Institute. Berkeley, CA. 12/2019

Manifold coordinates with physical meaning. NeuRIPS MLPS 2019, Vancouver, CA. 12/19

A family of algorithms for interpretable dimension reduction. UW eScience Seminar. Seattle, WA. 10/2019

Interpreting manifold embedding coordinates. UCLA IPAM Machine Learning for Physics Seminar. Los Angeles, CA 9/2019

Gradient group lasso identifies sparse functional basis for molecular manifolds. UW Physics Informed Machine Learning Workshop. Seattle, WA 6/2019

Gradient group lasso identifies sparse functional basis for molecular manifolds. UW CSSS 20th anniversary. Seattle, WA 5/2019

Non-linear regression for manifold learning in molecular dynamics. MSDSE Summit. Park City, UT 10/2018.

Wasserstein distance-based model selection for single-cell RNA-seq data. Presentation. Joint Statistical Meetings. Baltimore, MD. 08/2017

Election Forecasting. Panel. UW GPSS Academic Conference. Seattle, WA. 5/2017

Long-term clonal stability. Poster. American Society of Hematology Annual Conference. San Francisco, CA. 12/2014

NK-biased clonal expansion. Poster. Oncogenesis and Translation Medicine for the Treatment of Cancer Conference. Ribeirao Preto, SP, Brazil. 02/2014

Heegaard-Floer Braid Homology. Presentation. Columbia University Department of Mathematics Summer REU. 07/2014.

Helical modeling using the Frenet Frame, Presentation. Applications of Mathematics to Physiology and Medicine Workshop. Duke University Department of Mathematics. Durham, NC. 05/2012

Awards:

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| Big Data IGERT Fellowship, University of Washington, | 2017-2019 |
| Chateaubriand Fellowship, Embassy of France, | 2016 |
| GRFP Honorable Mention: Biostatistics, NSF, | 2016 |
| Dean's List, Columbia University, | 2009-2013 |

Support:

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| National Security Agency | 2021 |
| Allen Institute for Brain Science, | 2020 |
| Big Data IGERT Fellowship, University of Washington, | 2017-2019 |
| Amazon Internship, | 06/2017 – 09/2017 |
| Chateaubriand Fellowship, Embassy of France, | 06/2016 – 09/2016 |
| Research Assistantship, Fred Hutchinson Cancer Research Center, | 09/2015 – 06/2017 |
| Intramural Research Training Award, National Institutes of Health, | 07/2013 – 05/2013 |
| Geometry/Topology REU, Columbia University Department of Mathematics, | 05/2012 – 07/2012 |

Service activities:

Reviewer: JMLR, UAI2021, UAI2020

Organizer: UW Geometry Reading Group (<https://uwgeometry.github.io/>)

Organizer: 12 seasons statistics department intramural sports