Aaron J. Molstad, Ph.D.

Updated: Nov. 2018

Postdoctoral Research Fellow
Fred Hutchinson Cancer Research Center
Biostatistics Program, Public Health Sciences Division
1100 Fairview Ave. N.
Seattle, WA 98109-1024

Email: amolstad@fredhutch.org
Web: ajmolstad.github.io
Skype: aaron.j.molstad
Phone: +1 (651) 271-6986

INTERESTS Multivariate analysis; numerical optimization; statistical computing; statistical genetics and genomics; precision and covariance matrix estimation; matrix and tensor-valued data analysis (e.g., imaging); statistical and machine learning.

POSITIONS **Fred Hutchinson Cancer Research Center**, Seattle, WA
Postdoctoral Research Fellow, 2017 - Present
Mentors: Li Hsu, Wei Sun

EDUCATION **University of Minnesota - Twin Cities**, Minneapolis, MN
Ph.D., Statistics, 2017
Advisor: Adam J. Rothman
Committee Members: Xiaotong T. Shen, Julian Wolfson, Hui Zou

St. Olaf College, Northfield, MN
B.A., Mathematics, 2012
Honors: *cum laude*, Distinction in Statistics

RESEARCH **Accepted or Published:**

Molstad, A. J. and Rothman, A. J. (2016). Indirect multivariate response linear regression. **Biometrika**, **103**(3), 595-607.

Molstad, A. J. and Rothman, A. J. (2018+). A penalized likelihood method for classification with matrix-valued predictors. **Journal of Computational and Graphical Statistics**, forthcoming.

Molstad, A. J. and Rothman, A. J. (2018). Shrinking characteristics of precision matrix estimators. **Biometrika**, **105**(3), 563-574.

Submitted or Under Revision:

Molstad, A. J., Hsu, L. and Sun, W. (2018+). Gaussian process regression for survival time prediction with genome-wide gene expression. Submitted, preprint link.

Molstad, A. J., Weng, G., Doss, C. R. and Rothman, A. J. (2018+). An explicit mean-covariance parameterization for multivariate response linear regression. Submitted, preprint link.

In Preparation:

Molstad, A. J., Sun, W. and Hsu, L. Covariance-based cross-tissue eQTL mapping in GTEx.

Sherwood, B. and Molstad, A. J. Revisiting concave group penalties from computational and theoretical perspectives.

Molstad, A. J. The multivariate square-root lasso.

SOFTWARE **CRAN/GitHub:**

Molstad, A. J. (2015). FastBandChol: Covariance matrix estimation by banding the Cholesky factor. R package, http://cran.r-project.org/package=FastBandChol.

Molstad, A. J. (2016). MatrixLDA: Penalized matrix-normal linear discriminant analysis. R package, http://github.com/ajmolstad/MatrixLDA (v0.2 on CRAN).

Molstad, A. J. (2018). SurvGPR: Survival time prediction with Gaussian process regression. R package, http://github.com/ajmolstad/SurvGPR.

Molstad, A. J. (2018). MCMVR: Mean-covariance parameterized multivariate response linear regression. R package, http://github.com/ajmolstad/MCMVR.

TEACHING **Primary Instructor (UMN-TC):**

Introduction to Statistical Analysis, (STAT3011) Fall 2014 - Spring 2016 (4 semesters)

Teaching Assistant (UMN-TC):

Introduction to the Ideas of Statistics, (STAT1001) Fall 2012
Introduction to Statistical Analysis, (STAT3011) Spring 2013, Spring 2014
Data Analysis, (STAT3022) Summer 2013
Statistical Analysis, (STAT5021) Fall 2013
Applied Regression Analysis, (STAT5302) Summer 2014

Guest Lectures (UMN-TC):

Data Analysis, (STAT3022) Summer 2013
Applied Regression Analysis, (STAT5302) Summer 2014
Statistical Computing, (STAT5701) Fall 2016

TALKS **Invited Talks:**

Robust multivariate response linear regression: A spectral analog to the square-root lasso,
Symposium on Data Science and Statistics, ASA (Invited for May 2019), Seattle, WA.

An explicit mean-covariance parameterization for multivariate response linear regression,
Int. Conf. on Comp. and Method. Stat. (CMStatistics), ERCIM WG (Invited for Dec. 2018), Pisa, Italy.

Gaussian process regression for survival time prediction with genome-wide gene expression,
Applied Statistics Symposium, ICSA (June 2018), New Brunswick, NJ.

Shrinking characteristics of precision matrix estimators,
Symposium on Data Science and Statistics, ASA (May 2018), Reston, VA.

Indirect multivariate response linear regression,
Statistical Learning and Data Science Conference, ASA (June 2016), Chapel Hill, NC.

R Programming for Applied Math and Engineering,
SIAM: University of Minnesota Student Chapter (Apr. 2016), Minneapolis, MN.

Contributed Talks and Posters†:

Shrinking characteristics of precision matrix estimators,
†*IMS New Researchers Conference* (July 2018), Burnaby, BC, CA.

Gaussian process regression for survival time prediction with genome-wide gene expression,
Joint Statistical Meeting (Aug. 2018), Vancouver, BC, CA;
†*Fred Hutch Immunotherapy Integ. Res. Cen. Faculty Retreat* (Jan. 2018), Seattle, WA.

Contributed Talks and Posters† (continued):

Classification with matrix-valued predictors,
†*SAMSI Workshop on the Interface between Stat. and Optim.* (Feb. 2017), Durham, NC;
†*SAMSI Optimization Program Summer School* (Aug. 2016), Durham, NC;
Joint Statistical Meeting (Aug. 2016), Chicago, IL.

Uniqueness and existence of the matrix-normal maximum likelihood estimator,
Student Seminar, School of Stat., University of Minnesota (March 2016), Minneapolis, MN.

Model-based methods for high-dimensional data analysis,
SIAM: University of Minnesota Student Chapter (March 2015), Minneapolis, MN.

Indirect multivariate response linear regression,
Joint Statistical Meeting (Aug. 2015), Seattle, WA.

HONORS **University of Minnesota:**

Doctoral Dissertation Fellowship (2016-2017)
Graduate Research Partnership Program, *College of Liberal Arts* (2014-2015)
Lynn Y.S. Lin Fellowship for Statistical Consulting, *School of Statistics* (2013-2014)

Travel Awards:

IMS New Researchers Conference (July 2018), Burnaby, BC, CA
SAMSI Workshop on the Interface between Stat. and Optimization (Feb. 2017), Durham, NC
SAMSI Optimization Program Summer School (Aug. 2016), Durham, NC
ASA Statistical Learning and Data Science Conference (June 2016), Chapel Hill, NC

SERVICE **Reviewer:**

Annals of Statistics
Journal of the American Statistical Association
Journal of Computational and Graphical Statistics
Journal of Machine Learning Research
Journal of Multivariate Analysis
U.S. Geological Survey

Departmental Service (Fred Hutch):

Co-organizer, Biostatistics Program Postdoctoral Seminar Series, Summer 2017 - Present

Departmental Service (UMN-TC):

Curriculum co-organizer, Teaching Assistant Training Program, Summer 2016
Co-organizer, School of Statistics Advisory Committee panel discussion, Spring 2015

MISC. **Formal Consulting:**

Spanish & Portuguese Studies, Mandy Menhke Ph.D. & Carol Klee Ph.D. (UMN-TC), Fall 2016
Biochemistry, Lab of Edgar Arriaga Ph.D. (UMN-TC), Summer 2013

Relevant Employment:

Interdisciplinary Research Fellow, *St. Olaf College*, 2011-2012
Data Science Intern, *Productive Corporation*, Minneapolis, MN, Summer 2011
Researcher, *Office of Institutional Research and Effectiveness*, *St. Olaf College*, Summer 2011