Carlos J. Soto

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EMPLOYMENT EXPERIENCE

Bruce Lindsay Visiting Assistant Research Professor August 2020 - Present
Pennsylvania State University

Research position exploring both the theoretical and methodological connections between differential privacy and the geometry of the space in which the data live. Implemented differentially private models on manifolds and evaluated their performance as compared to state of the art techniques. This position also has a teaching component of six credits (two courses) per academic year.

Under the supervision of Matthew Reimherr and Aleksandra Slavković.

EDUCATION

PhD Biostatistics Fall 2017 – July 2020
Florida State University *Tallahassee, Florida*

- Cumulative GPA: 4.0
- Dissertation "Structural Data Analysis in Bioinformatics: With a Focus on Chromosomes and Proteins"
- Advised by Anuj Srivastava

MS Biostatistics Fall 2015 – Fall 2017
Florida State University *Tallahassee, Florida*

- Cumulative GPA: 4.0

MS Mathematics Fall 2013 – Spring 2015
University of Wisconsin–Milwaukee *Milwaukee, Wisconsin*

- Cumulative GPA: 3.618

BA Mathematics Fall 2007 – Spring 2011
Ripon College *Ripon, Wisconsin*

- Cumulative GPA: 3.42, Graduated Cum Laude

TEACHING EXPERIENCE

Instructor Spring 2021, Fall 2021, Fall 2022
Pennsylvania State University *State College, PA*

Full instructor for STAT 380: Data Science Through Statistical Reasoning and Computation, responsible the entire course except grading.

Instructor Fall 2016 – Spring 2020
Florida State University *Tallahassee, Florida*

Full instructor for STA 2171: Statistics for Biology, responsible for lecturing and creating all coursework including worksheets and exams.

Teaching Assistant Fall 2015 – Spring 2016
Florida State University *Tallahassee, Florida*

Teaching Assistant for CGS 2518: Spreadsheets for Business, responsible for assisting students with assignments as well as grading assignments and exams.

Instructor Fall 2013 – Spring 2015
University of Wisconsin–Milwaukee *Milwaukee, Wisconsin*

Full instructor for MATH 098, MATH 108, and MATH 105, responsible for lecturing and creating all coursework including worksheets and exams.

Math and Statistics Tutor and Assistant Fall 2009 – Spring 2011
Ripon College *Ripon, Wisconsin*

Assisted fellow undergraduate students in math and statistics courses including multivariate calculus, linear algebra, and introductory statistics.

PUBLICATIONS

1. Carlos Soto, Darshan Bryner, Nicola Neretti, and Anuj Srivastava. Toward a three-dimensional chromosome shape alphabet. *Journal of Computational Biology*, pages 601–618, 2021
2. Carlos J Soto, Peiyao A Zhao, Kyle N Klein, David M Gilbert, and Anuj Srivastava. Statistical comparisons of chromosomal shape populations. In *2021 IEEE 18th International Symposium on Biomedical Imaging (ISBI)*, pages 788–791. IEEE, 2021
3. Matthew Reimherr, Karthik Bharath, and Carlos Soto. Differential privacy over riemannian manifolds. *Advances in Neural Information Processing Systems*, 34, 2021
4. Carlos Soto, Audrey Dalgarno, Darshan Bryner, Benjamin McLaughlin, Nicola Neretti, and Anuj Srivastava. Representation of chromosome conformations using a shape alphabet across modeling methods. In *2021 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, pages 151–156, 2021
5. Jose Cordova, Carlos Soto, Mostafa Gilanifar, Yuxun Zhou, Anuj Srivastava, and Reza Arghandeh. Shape preserving incremental learning for power systems fault detection. *IEEE control systems letters*, 3(1):85–90, 2018

Submitted

1. Carlos Soto, Karthik Bharath, Matthew Reimherr, and Aleksandra Slavkovic. Shape and structure preserving differential privacy. *Submitted: Advances in Neural Information Processing Systems*, 2022
2. Carlos Soto, Audrey Dalgarno, Darshan Bryner, Fred Huffer, Nicola Neretti, and Anuj Srivastava. Tadbay: A bayesian topologically associated domain caller. In *Submitted: 2022 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, 2022

In Progress

1. C. Soto et al. "Efficient mean estimation on manifolds."

INVITED TALKS AND PRESENTATIONS

* **The 35th New England Statistics Symposium** May 22-25, 2022
Geometry-driven Statistics: Differential Privacy on Manifolds Storrs (UConn), CT, USA

Workshop on Differential Privacy and Statistical Data Analysis July 25-29, 2022
Intrinsic Differential Privacy Fields Institute (Toronto), ON, CAN

Computational and Methodological Statistics Dec 18-20, 2021
Recent advances in differential privacy: Differential privacy over Riemannian manifolds London, UK

† **Joint Statistical Meetings(JSM)** Aug 8, 2022
Shape and Structure Preserving Differential Privacy on Manifolds Washington D.C.

* **IEEE-BIBM(International Conference on Bioinformatics and Biomedicine)** Dec 9-12,2021

Representation of Chromosome Conformations Using a Shape Alphabet Across Modeling Methods Virtual
Joint Math Meetings (JMM) April 6, 2022
Differential Privacy Over Riemannian Manifolds Virtual
IEEE-ISBI (International Symposium of Biomedial Imaging) April 13-16, 2021
Statistical Comparisons of Chromosomal Shape Populations Virtual
‡ **NeurIPS (Neural Information Processing Systems)** 2021
Differential Privacy Over Manifolds Virtual
Stochastic Modeling and Computational Statistics (SMAC) Dec 3, 2021
Differential Privacy Over Riemannian Manifolds State College, PA
Joint Statistical Meetings(JSM) August 5, 2020
Statistical Comparison of Chromosomal Shape Populations Virtual
**Invited* † *Upcoming* ‡ *Poster*

SERVICE

- Reviewer for *Annals of Applies Statistics* and *Institute of Electrical and Electronics Engineers/Association for Computing Machinery* (*IEEE/ACM*).
- Member of the Penn State Statistics Department Climate and Diversity Committee.
- Organizer of Penn State's Statistics Department Differential Privacy group Fall 2021.
- ASA Student Chapter President - Florida State University 2018.

MEMBERSHIPS

- American Statistical Association (ASA)
- Institute of Electrical and Electronics Engineers (IEEE)
- Mathematical Association of America (MAA)
- New England Statistical Society (NESS)

SKILLS

Proficient MATLAB, R, LaTeX
Familiar Python, C++, SAS, and SQL
Languages English (fluent), Spanish (fluent)