

Leonardo Torres

Network Science Institute
Northeastern University
Boston 02115, MA, USA

Email: leo@leotrs.com
Home: <http://leotrs.com>
Code: github.com/leotrs

Education

[†] *Indicates expected*

- 2016–2021 [†] **Ph.D. Network Science, Northeastern University**
Focus: Geometric Aspects of Mining Complex Networks
Advisor: Tina Eliassi-Rad
Dissertation Proposal: November 2019
Boston, MA, USA
- 2009–2015 **B.Sc. Mathematics, *Pontificia Universidad Católica del Perú***
Lima, Perú
- 2013–2014 **College of The Holy Cross**
Study abroad & Spanish teaching assistant
Worcester, MA

Selected Honours and Awards

- July 2019 LANET'19 Scholarship for young researchers
Financial aid for attendance to the LANET'19 conference
- May 2019 Network Science Institute Travel Grant
Financial aid for academic travel in Summer 2019
- 2015 *Pontificia Universidad Católica del Perú*
Grades within top 3% in the 75-year history of the Sciences and Engineering Department

Research Articles

Published Articles

- Torres, L., Suárez-Serrato, P. and Eliassi-Rad, T. **Non-backtracking cycles: length spectrum theory and graph mining applications.** Appl Netw Sci (2019) 4: 41. [\[link\]](#)

Preprints

- Leo Torres, K. S. Chan and T. Eliassi-Rad. **Geometric Laplacian Eigenmap Embedding.** Preprint, arXiv:1905.09763 [cs.LG], 2019. Under review. [\[preprint\]](#)

Academic Presentations

Invited Presentations

- **Non-Backtracking Cycles: Length Spectrum Theory and Graph Mining Applications.** Torres, L., Suárez-Serrato, P. and Eliassi-Rad, T. MiDAS Research Group Seminar, Boston University. Boston, MA, USA. November 2019.

Contributed Presentations

- **The Largest Non-Backtracking Eigenvalue under Node Removal.** Leo Torres, T. Eliassi-Rad. Student Research Symposium of the Network Science Institute. Boston, MA, USA. November 2019. [\[slides\]](#)
- **GLEE: Geometric Laplacian Eigenmap Embedding.** Leo Torres, K. S. Chan, and T. Eliassi-Rad. Latin American Conference on Complex Networks (LANET'19). Cartagena, Colombia. August 2019. [\[slides\]](#)
- **GLEE: Geometric Laplacian Eigenmap Embedding.** Leo Torres, K. S. Chan, and T. Eliassi-Rad. The 2019 International Conference on Network Science (NetSci'19). Burlington, VT, USA. May 2019. [\[slides\]](#)
- **Graph Distance from a Topological View of Non-Backtracking Cycles.** Leo Torres, P. Suárez Serrato, T. Eliassi-Rad. Student Research Symposium of the Network Science Institute. Boston, MA, USA. November 2018. [\[slides\]](#)
- **A Bridge Between Homotopy Theory and Network Science.** Leo Torres, P. Suárez Serrato, T. Eliassi-Rad. SIAM Workshop on Network Science 2018 (SIAMNS'18). Portland, OR, USA. July 2018. [\[slides\]](#)
- **A Study of Cycle Length Spectra.** Leo Torres, P. Suárez Serrato, T. Eliassi-Rad. The 2018 International Conference on Network Science (NetSci'18). Paris, France. June 2018. [\[slides\]](#)

Tutorials

- Co-tutor for part 3 of Tutorial on **Graph Metric Spaces**. SIAM International Conference on Data Mining (SDM19), Calgary, Canada. May 2019. <https://neu-spiral.github.io/GraphMetricSpaces/>
- Co-tutor for part 3 of Tutorial on **Graph Metric Spaces**. International Conference on Knowledge Discovery and Data Mining (KDD18), London, UK. August 2018. <https://neu-spiral.github.io/GraphMetricSpaces/>

Posters

- **The why, how, and when of representations for complex systems**. Leo Torres and Ann Sizemore Blevins, Danielle S. Bassett and Tina Eliassi-Rad. The 2019 International Conference on Network Science (NetSci'19). Burlington, Vermont, USA. May 2019. [\[poster\]](#)
- **GLEE: Geometric Laplacian Eigenmap Embedding**. Leo Torres, K. S. Chan, and T. Eliassi-Rad. New England Machine Learning Day 2019 (NEML'19). Boston, MA, USA. May 2019. [\[poster\]](#)
- **GLEE: Geometric Laplacian Eigenmap Embedding**. Leo Torres, K. S. Chan, and T. Eliassi-Rad. Graph Exploitation Symposium (GraphEx'19). Dedham, MA, USA. April 2019. [\[poster\]](#)
- **Graph Distance from the Topological Perspective of Nonbacktracking Cycles**. Leo Torres and T. Eliassi-Rad. New England Machine Learning Day 2018 (NEML'18). Cambridge, MA, USA. May 2018. [\[poster\]](#)
- **A Bridge between Homotopy Theory and Network Science**. Leo Torres and T. Eliassi-Rad. Graph Exploitation Symposium (GraphEx'18). Dedham, MA, USA. April 2018. [\[poster\]](#)
- **A Study of Cycle Length Distributions: Asymptotics, Applications, and Links to Homotopy Theory**. Leo Torres and T. Eliassi-Rad. The 9th International Conference on Complex Networks (CompleNet'18). Boston, MA, USA. March 2018. [\[poster\]](#)

Other Academic Activities

Conferences and Symposia

- Co-organizer of the **Diversify NetSci** conference satellite. NetSci'19. May 2019. Burlington, VT, USA. <https://www.networkscienceinstitute.org/diversifynetsci2019>
- Co-organizer of the first **Student Research Symposium of NetSI**. Network Science Institute, Northeastern University. November 2018. Boston, MA, USA.
- Co-organizer and lecturer of Linear Algebra at the **Network Science Institute Bootcamp for incoming PhD students**. August 2018. Boston, MA, USA.

- Co-organizer of the **Society of Young Network Scientists** pre-conference event. CompleNet'18. March 2018. Boston, MA, USA.
- Co-organizer of the first **Symposium for the Society of Young Network Scientists**. NetSci'17. June 2017. Indianapolis, IN, USA.
- Co-organizer and lecturer of Linear Algebra at the first **Network Science Institute Bootcamp for incoming PhD students**. August 2017. Boston, MA, USA.

Journal Referee

- IEEE Transactions on Knowledge and Data Engineering (TKDE).
- Journal of Machine Learning Research (JMLR).
- Proceedings of the Royal Society A (Proceedings A).

Published Software (non peer-reviewed)

- **netrd** [\[link\]](#) netrd is a multi-purpose library with dozens of state-of-the-art implementations of algorithms for simulating dynamics on networks, measuring the distance between networks, and reconstructing networks from temporal data.
- **sunbeam** [\[link\]](#) sunbeam is a library that uses the non-backtracking matrix to provide functionality for graph mining such as graph distance and graph embedding.
- **glee** [\[link\]](#) glee is a library that uses the simplex geometry of the Laplacian matrix to compute a geometric embedding of an undirected graph.
- **decu** [\[link\]](#) decu is a suite of command line tools to automate the menial tasks involved in the development of experimental computation projects.
- **erdos** [\[link\]](#) erdos is an educational site for learning about and practicing Network Science through programming exercises.

Professional Experience

- Summer 2019 **Research Intern – Yahoo! Research**
Graph mining and machine learning intern under the supervision of Yifan Hu.
New York, NY, USA
- Spring 2016 **Attendant – Recurse Center**
Spent twelve weeks at a programmers' retreat focusing full-time on developing programming skills in a self-directed way. Focus on algorithm design and high-quality code writing standards.
New York, NY, USA
- Spring 2015 **Calculus 4 Teaching Assistant – Pontificia Universidad Católica del Perú**
Proctored and graded exams.
Lima, Perú
- Spring 2015 **Organizer of the first Real Analysis Summer School – Pontificia Universidad Católica del Perú**
Taught real analysis at the undergraduate level, designed and graded homework, gave lectures, supervised presentations.
Lima, Perú
- 2013 – 2014 **Foreign Language Assistant – College of The Holy Cross**
Directed Spanish conversation lessons focusing on speaking, listening, and cultural sharing. Basic, intermediate, and advanced levels.
Worcester, MA, USA
- 2012 - 2014 **Research Programmer – Wolfram Research South America**
Content development for the Wolfram|Alpha knowledge engine.
Lima, Perú

Miscellaneous

- Languages: Spanish (native), English (bilingual), French (beginner).
- Computer skills: Python (expert), Mathematica, Linux, LaTeX (advanced), MATLAB, C/C++, R, Javascript, lua, LISP (intermediate).
- Advocacy: Open {Science, Source, Data}, inclusion and diversity.