Leonardo Torres

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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*
Dissertation Committee: *Rose Yu, Dmitri Krioukov, Cristopher Moore, Tina Eliassi-Rad (Chair)*
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

- Leo Torres, K. S. Chan, and T. Eliassi-Rad. **GLEE: Geometric Laplacian Eigenmap Embedding.** Journal of Complex Networks, Volume 8, Issue 2, April 2020, cnaa007. [link]

- Leo Torres, P. Suárez-Serrato and T. Eliassi-Rad. **Non-backtracking Cycles: Length Spectrum Theory and Graph Mining Applications.** Appl Netw Sci (2019) 4: 41. [link]

Preprints

- Leo Torres, K. S. Chan, H. Tong and T. Eliassi-Rad. **Node Immunization with Non-backtracking Eigenvalues.** Preprint. arXiv:2002.12309 (2020) [link]

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'20. June 2020. Rome, Italy.
- 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 embedidng 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** (New York, NY, USA)
Machine learning intern under the supervision of Yifan Hu.

Spring 2016 Attendant – **Recurse Center** (New York, NY, USA)
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.

Spring 2015 **Calculus Teaching Assistant** – *Pontificia Universidad Católica del Perú* (Lima, Perú)
Proctored and graded exams.

Spring 2015 **First Real Analysis Summer School** – *Pontificia Universidad Católica del Perú* (Lima, Perú)
Main organizer; taught real analysis at the undergraduate level, designed and graded homework, gave lectures, supervised presentations.

2013 – 2014 **Foreing Language Assistant** – College of The Holy Cross (Worcester, MA, USA)
Directed Spanish conversation lessons focusing on speaking, listening, and cultural sharing. Basic, intermadiate, and advanced levels.

2012 - 2014 **Research Programmer** – Wolfram Research South America (Lima, Perú)
Content development for the Wolfram|Alpha knowledge engine.

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.