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

- B. Klein, T. LaRock, S. McCabe, Leo Torres, F. Privitera, B. Lake, M. U. G. Kraemer, J. S. Brownstein, D. Lazer, T. Eliassi-Rad, S. V. Scarpino, M- Chinazzi, and A. Vespignani. **Assessing changes in commuting and individual mobility in major metropolitan areas in the United States during the COVID-19 outbreak.** Technical Report. [link]

- 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.