Leonardo Torres

Network Science Institute

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Code: github.com/leotrs

Education

[†] *Indicates expected*

2016–2021[†]   **Ph.D. Network Science, Northeastern University**
Focus: *Spectral 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

- L. 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] [code]

- L. 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] [code]

Preprints

- S. Yu, L. Torres, S. Alfeld, T. Eliassi-Rad, Y. Vorobeychik. **Optimizing Graph Structure for Targeted Diffusion**. Preprint. arXiv:2008.05589 (2020). [link]

- L. Torres, A. S. Blevins, D. S. Bassett, T. Eliassi-Rad. **The why, how, and when of representations for complex systems**. Preprint. arXiv:2006.02870 (2020). [link]

- B. Klein, T. LaRock, S. McCabe, L. Torres, L. Friedland, F. Privitera, B. Lake, M. U. G. Kraemer, J. S. Brownstein, D. Lazer, T. Eliassi-Rad, S. V. Scarpino, A. Vespignani, and M- Chinazzi. **Reshaping a nation: Mobility, commuting, and contact patterns during the COVID-19 outbreak.** Technical report (2020). [link]

- B. Klein, T. LaRock, S. McCabe, L. 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 (2020). [link]

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

Academic Presentations

Invited Presentations

- **Stopping Disease Spreading with Non-Backtracking Eigenvalues.** L. Torres, K. S. Chan, H. Tong and T. Eliassi-Rad. ARL CRA Webinar, Penn State University. Boston, MA, USA. August 2020. [slides]

- **Stopping Disease Spreading with Non-Backtracking Eigenvalues.** L. Torres, K. S. Chan, H. Tong and T. Eliassi-Rad. Khoury College Tech Talks, Northeastern University. Boston, MA, USA. June 2020.

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

Contributed Presentations

- **The Largest Non-Backtracking Eigenvalue under Node Removal.** L. Torres, T. Eliassi-Rad. Student Research Symposium of the Network Science Institute. Boston, MA, USA. November 2019. [slides]

- **GLEE: Geometric Laplacian Eigenmap Embedding.** L. 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.** L. 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.** L. 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.** L. 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.** L. 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. [link]

- Co-tutor for part 3 of Tutorial on **Graph Metric Spaces**. International Conference on Knowledge Discovery and Data Mining (KDD18), London, UK. August 2018. [link]

Posters

- **The why, how, and when of representations for complex systems.** L. Torres and A. Sizemore Blevins, D. S. Bassett and T. Eliassi-Rad. The 2019 International Conference on Network Science (NetSci'19). Burlington, Vermont, USA. May 2019. [poster]

- **GLEE: Geometric Laplacian Eigenmap Embedding.** L. 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.** L. 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.** L. 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.** L. 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.** L. Torres and T. Eliassi-Rad. The 9th International Conference on Complex Networks (CompleNet'18). Boston, MA, USA. March 2018. [poster]

Service

Conferences and Symposia

- Co-organizer of the **Diversify NetSci** conference satellite. NetSci'20. September 2020. Rome, Italy. [link]

- Co-organizer of the **Diversify NetSci** conference satellite. NetSci'19. May 2019. Burlington, VT, USA. [link]

- 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).
- Random Matrices: Theory and Applications (RMTA)

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.

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.