

Fabio Miranda

ASSISTANT PROFESSOR, DEPARTMENT OF COMPUTER SCIENCE, COLLEGE OF ENGINEERING

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Research Interests

I am interested in developing techniques that allow for the interactive visual analysis of large-scale data, combining methods from visualization, data management, machine learning and computer graphics. I have worked closely with domain experts from different fields and the outcome of these collaborations included not only research published in leading venues, but also systems that were made available to experts in academia, industry and government agencies. My work has also received extensive coverage from different media outlets, including The New York Times, The Economist, Architectural Digest, Curbed, among others.

Education

2012 - 2018

Ph.D. in Computer Science

New York, NY, USA

New York University (NYU)

Advised by Professor Cláudio T. Silva.

Dissertation: "Data structures for the interactive visual analysis of urban data".

2009 - 2011

M.S. in Computer Science

Rio de Janeiro, RJ, Brazil

Pontifical Catholic University of Rio de Janeiro (PUC-Rio)

Advised by Professor Waldemar Celes.

Thesis: "Volume rendering of unstructured hexahedral meshes".

2005 - 2009

B.S. in Computer Science

Belo Horizonte, MG, Brazil

Federal University of Minas Gerais (UFMG)

Advised by Professor Luiz Chaimowicz.

Professional Experience

Fall 2020 - present

University of Illinois at Chicago

Chicago, IL, USA

Assistant Professor, Department of Computer Science, College of Engineering

Fall 2018 - Fall 2020

New York University

New York, NY, USA

Postdoctoral researcher

Summer 2016

Argonne National Laboratory

Lemont, IL, USA

Research intern, Mentor: Venkatram Vishwanath

Summer 2015

IBM T.J. Watson Research Center

Yorktown Heights, NY, USA

Research intern, Mentor: Bruce D'Amora

Summer 2014

AT&T Research

Middletown, NJ, USA

Research intern, Mentors: Lauro Lins and James Klosowski

Summer 2013

Sandia National Laboratories

Albuquerque, NM, USA

Research intern, Mentor: Patricia Crossno

2009 - 2012

TecGraf / PUC-Rio

Rio de Janeiro, Brazil

Research assistant, Mentor: Waldemar Celes

Awards

2018

SIGMOD Best Demonstration Award

For "Interactive Visual Exploration of Spatio-Temporal Urban Data Sets Using Urbane".

2018

Pearl Brownstein Doctoral Research Award

For doctoral research that shows the greatest promise, awarded by NYU.

- 2010-2012 CAPES and Petrobras Fellowships
Awarded during M.S. studies.
- 2006-2009 FINEP and CNPq Fellowships
Awarded during B.S. studies.

Selected Media Coverage

- September 2017 Urban Pulse Uses Social Media Data to Show Cities in a New Light
Architectural Digest [↗](#)
- September 2017 New program wants to improve cities with the power of tweets and Flickr uploads
Curbed [↗](#)
- December 2016 Mapping the Shadows of New York City: Every Building, Every Block
The New York Times [↗](#)
- October 2016 Listen to the music of the traffic in the city
The Economist [↗](#)

Publications

- 2022 CitySurfaces: City-scale Semantic Segmentation of Sidewalks Surfaces
M. Hosseini, **F. Miranda**, J. Lin, C. Silva
Sustainable Cities and Society (accepted)
- Visualizing Simulation Ensembles of Extreme Weather Events
C. V. de Souza, P. Luz, M. Cataldi, **F. Miranda**, M. Lage
Computers & Graphics (minor revision)
- 2021 Visualizing Environmental Justice Issues in Urban Areas with a Community Input Approach
J. Flax-Hatch, S. Srabanti, **F. Miranda**, A. Sambanis, M. Cailas
2nd Spatial Data Science Symposium
- Sidewalk Measurements from Satellite Images: Preliminary Findings
M. Hosseini, I. B. Araujo, H. Yazdanpanah, E. Tokuda, **F. Miranda**, C. Silva, R. M. Cesar Jr
2nd Spatial Data Science Symposium
- COVID-19 EnsembleVis: Visual Analysis of County-level Ensemble Forecast Models
S. Srabanti, G. E. Marai, **F. Miranda**
12th Workshop on Visual Analytics in Healthcare
- Transportation Scenario Planning with Graph Neural Network
A. A. Peregrino, S. Pradhan, Z. Liu, N. Ferreira, **F. Miranda**
10th International Workshop on Urban Computing
- UrbanRama: Navigating Cities in Virtual Reality
S. Chen, **F. Miranda**, N. Ferreira, M. Lage, H. Doraiswamy, C. Brenner, C. Defanti, M. Koutsoubis, L. Wilson, K. Perlin, C. Silva
IEEE Transactions on Visualization and Computer Graphics (accepted, to appear)
- 2020 Urban Mosaic: Visual Exploration of Streetscapes Using Large-scale Image Data
F. Miranda, M. Lage, H. Doraiswamy, M. Hosseini, G. Dove, C. T. Silva
2020 CHI Conference on Human Factors in Computing Systems.
- Learning Geo-Contextual Embeddings for Commuting Flow Prediction
Z. Liu, **F. Miranda**, W. Xiong, J. Yang, Q. Wang, C. T. Silva
Thirty-Fourth AAAI Conference on Artificial Intelligence.

- 2019 Shadow Accrual Maps: Efficient Accumulation of City-Scale Shadows over Time
F. Miranda, H. Doraiswamy, M. Lage, L. Wilson, M. Hsieh, C. T. Silva
IEEE Transactions on Visualization and Computer Graphics, vol. 25, no. 3, pp. 1559-1574, Mar 2019.
 Featured on [The New York Times](#)
- 2018 Time Lattice: A Data Structure for the Interactive Visual Analysis of Large Time Series
F. Miranda, M. Lage, H. Doraiswamy, C. Mydlarz, J. Salamon, Y. Lockerman, J. Freire, C. T. Silva
Computer Graphics Forum, vol. 37, no. 3, pp. 23-35, Jun 2018.
- Interactive Visual Exploration of Spatio-Temporal Urban Data Sets using Urbane
 H. Doraiswamy, E. Tzirita Zacharatou, **F. Miranda**, M. Lage, A. Ailamaki, C. T. Silva, J. Freire
2018 ACM SIGMOD Intl. Conf. on Management of Data - Demo.
[Best Demonstration Award](#)
- Spatio-Temporal Urban Data Analysis: A Visual Analytics Perspective
 H. Doraiswamy, J. Freire, M. Lage, **F. Miranda**, C. T. Silva
IEEE Computer Graphics and Application, vol. 38, no. 5, pp. 26-35, Sept/Oct 2018.
- TopKube: A Rank-Aware Data Cube for Real-Time Exploration of Spatiotemporal Datasets
F. Miranda, L. Lins, J. Klosowski, C. T. Silva
IEEE Transactions on Visualization and Computer Graphics, vol. 24, no. 3, pp. 1394-1407, Mar 2018.
- 2017 Urban Pulse: Capturing the Rhythm of Cities
F. Miranda, H. Doraiswamy, M. Lage, K. Zao, B. Goncalves, L. Wilson, M. Hsieh, C. T. Silva
IEEE Transactions on Visualization and Computer Graphics, vol. 23, no. 1, pp. 791-800, Jan 2017.
[Featured on The Economist, invited to SIGGRAPH 2017 TVCG special session](#)
- Data Visualization Tool for Monitoring Transit Operation and Performance
 A. Kurkcu, **F. Miranda**, K. Ozbay, C. T. Silva
5th IEEE Intl. Conf. on Models and Technologies for Intelligent Transportation Systems (2017).
- 2016 TopKube: A Rank-Aware Data Cube for Real-Time Exploration of Spatiotemporal Datasets
F. Miranda, L. Lins, J. Klosowski, C. T. Silva
Data Systems for Interactive Analysis (DSIA) 2016.
- 2012 Volume Rendering of Unstructured Hexahedral Meshes
F. Miranda, and W. Celes
The Visual Computer Journal, vol. 28, no. 10, pp. 1005-1014, Oct 2012.
- 2011 Accurate Volume Rendering of Unstructured Hexahedral Meshes
F. Miranda, and W. Celes
24th Sibgrapi Conference on Graphics, Patterns and Images (2011).
- Illustrative Volume Visualization for Unstructured Meshes Based on Photic Extremum Lines
 A. Rocha, **F. Miranda**, and W. Celes
24th Sibgrapi Conference on Graphics, Patterns and Images (2011).

Funding

Spring 2022 - Spring 2023

PRESUR: Planning a Resilient and Equitable State Using Real-time Data
 Co-PI, \$125,000 (total)

Discovery Partners Institute

Teaching Experience

Fall 2021

CS594: Big Data Visualization & Analytics
 Graduate course. No. of students enrolled: 29.
 Average student evaluation score: 4.4 / 5.0 (n=25, std. dev.=0.76)
 Course page [↗](#)

University of Illinois at Chicago

Spring 2021

CS425: Computer Graphics I

University of Illinois at Chicago

Undergraduate course. No. of students enrolled: 41.

Average student evaluation score: 4.03 / 5.0 (n=33, std. dev.=0.98)

Course page [↗](#)

Advised Students

2021 -

Ph.D. students (adviser)

University of Illinois at Chicago

Kazi Omar, Marius Horga, Sanjana Srabanti (co-advising with G. Elisabeta Marai)

2021 -

M.Sc. students (adviser)

University of Illinois at Chicago

Soham Pradhan

2021 -

Undergraduate students (adviser)

University of Illinois at Chicago

Daniel Hodczak, Jayanth Podapati

2018 -

Ph.D. students (mentor)

New York University

Zhicheng Liu (CS PhD student at Southeast University, China), Maryam Hosseini (Urban Systems PhD student at Rutgers), Shaoyu Chen (CS PhD student at NYU), João Rulff (CS PhD student at NYU).

Selected Invited Talks and Presentations

April 2021

Interactive Visual Analysis of Urban Data: Beyond Flatland

Online

Department of Energy Computer Graphics Forum 2021

Department of Energy

April 2021

Interactive Visual Analysis of Urban Data: A Computational Perspective on Cities

Porto Alegre, RS, Brazil

Federal University of Rio Grande do Sul

March 2021

Interactive Visual Analysis of Urban Data: A Computational Perspective on Cities

Niteroi, RJ, Brazil

Fluminense Federal University

February 2020

Interactive Visual Analysis at Scale: From Data to Actionable Insights

New Orleans, LA, USA

Tulane University

January 2020

Interactive Visual Analysis at Scale: From Data to Actionable Insights

Portland, OR, USA

Portland State University

December 2018

Exploration of Street-Level Images at Scale

New York City, NY, USA

Pedestrian Movement Technology Showcase at Metro North

November 2018

Shadow Accrual Maps: Efficient Accumulation of City-Scale Shadows over Time

Berlin, Germany

IEEE Visualization Conference (VIS)

June 2018

Time Lattice: A Data Structure for the Interactive Visual Analysis of Large Time Series

Brno, Czech Republic

EG/VGTC Conference on Visualization (EuroVis)

October 2017

TopKube: A Rank-Aware Data Cube for Real-Time Exploration of Spatiotemporal Datasets

Phoenix, AZ, USA

IEEE Visualization Conference (VIS)

September 2016

Visualizing and Exploring Urban Data

Boston, MA, USA

Data Visualization Summit

Academic Services

Conference and workshop
organization

VIS 2021, Local co-chair (2021)

The Future of Global-Scale Spatial Data Collection and Analyses on Urban (in)Accessibility for People with Disabilities Workshop, Co-chair (2021)

Program committees

EuroVis (2022)

Visualization and Data Analysis Conference (2022)

Sibgrapi (2019, 2020, 2021)

IEEE VIS Short papers (2019, 2020, 2021)

Grant reviewer

NSF Reviewer (2022)

Discovery Partners Institute grant reviewer (2021)

Journal reviewer

IEEE Transactions on Visualization and Computer Graphics

IEEE Transactions on Big Data

IEEE Transactions on Intelligent Transportation Systems

The Visual Computer Journal

Transportation Research Record Journal

International Journal of Geo-Information

International Conference on Pattern Recognition

Conference reviewer

IEEE VIS (2018, 2019, 2020, 2021)

Sibgrapi (2018, 2019, 2020, 2021)

VLDB (2021)

WWW (2021)

University Services

Departmental committees

Faculty Search Committee (2022)

Graduate Admission Committee (2020, 2021)

Reviewer

Provost's Graduate Research Award reviewer (2020)

WCP committees

Carla Floricel (2021), Md Nafiul Alam Nipu (2021), Andrew Wentzel (2021), Muhammad Abdul Wahhab (2021)

Master's project
committees

Parikshit Solunke (2021), Pavana Doddi (2021)

Professional Memberships

Association for Computing Machinery (ACM).

Brazilian Computer Society (Sociedade Brasileira de Computação, SBC).