CURRENT RESEARCH INTERESTS	<ul><li>☐ Machine Learning</li><li>☐ Matrix/Tensor Computations</li><li>☐ Low-Rank Models</li></ul>	<ul> <li>□ Spatiotemporal Data Modeling</li> <li>□ Missing Data Imputation</li> <li>□ Time Series Analysis</li> </ul>	☐ Intelligent Transportation☐ Smart Cities☐ Human Mobility	
Contact Information	chenxy346@gmail.com  https://xinychen.github. xinychen chenxy346 Google Scholar 8 684 citati	io (homepage) ons (h-index: 10 & i10-index: 10)		
Biography	In Summer 2023, I will finish my PhD at University of Montreal (UdeM), with support from the IVADO PhD Excellence Scholarship and the CIRRELT PhD Excellence Scholarship. My PhD research focuses on machine learning, spatiotemporal data modeling, and intelligent transportation systems.			
Education	PhD in Civil Engineering (Transportation)  Polytechnique Montreal, University of Montreal  Nontreal, Canada  VIVADO PhD Excellence Scholarship & CIRRELT PhD Excellence Scholarship  Thesis: Spatiotemporal Traffic Data Imputation and Forecasting with Low-Rank Models  Advisor: Nicolas Saunier (full professor at Polytechnique Montreal)  Co-advisor: Lijun Sun (assistant professor at McGill University)			
	Master's degree in Traffic I	nformation Engineering & Contro 2 2% in total) woral Missing Traffic Data by Bayesian	ol 2016.08 - 2019.06 Guangzhou, China	
	<ul> <li>Advisor: Zhaocheng He (full professor)</li> <li>Bachelor's degree in Traffic Engineering</li> <li>Guangzhou University</li> <li>Thesis: Modeling Vehicles' Time Headway with Log-Normal and Port</li> <li>Advisor: Xiaodong Zang (full professor)</li> </ul>		2012.09 - 2016.06 Guangzhou, China Power-Law Distribution	
Honours and Awards	<ul> <li>CIRRELT PhD Excellence Schola</li> <li>IVADO PhD Excellence Schola</li> <li>Outstanding Thesis Award (by</li> <li>National Scholarship (by Ministra)</li> </ul>	rship (\$100,000, by Institute for Dat Sun Yat-Sen University)	2021.12 (a Valorisation) 2020.04 2019.06 2018.11	
Refereed Journal Papers	Google Scholar: https://scholar.google.com/citations?user=mCrW04wAAAAJ&hl  ◆ First-author papers  7. Xinyu Chen, Lijun Sun (2022). Bayesian temporal factorization for multidimensional time series prediction. IEEE Transactions on Pattern Analysis and Machine Intelligence. 44 (9): 4659-4673.  ⑤ https://doi.org/10.1109/TPAMI.2021.3066551  ⑤ JCR-Q1			
	Systems. 23 (8): 12301-12310.  thttps://doi.org/10.1109/	TITS.2021.3113608	FCI I at a constant (1 or 0.10/.)	

5. Xinyu Chen, Yixian Chen, Nicolas Saunier, Lijun Sun (2021). Scalable low-rank tensor learning for spatiotemporal traffic data imputation. *Transportation Research Part C: Emerging Technologies*. 129: 103226.

4. Xinyu Chen, Jinming Yang, Lijun Sun (2020). A nonconvex low-rank tensor completion model for spatiotemporal traffic data imputation. *Transportation Research Part C: Emerging Technologies*. 117: 102673.

3. Xinyu Chen, Zhaocheng He, Yixian Chen, Yuhuan Lu, Jiawei Wang (2019). Missing traffic data imputation and pattern discovery with a Bayesian augmented tensor factorization model. *Transportation Research Part C: Emerging Technologies*. 104: 66-77.

**2.** Xinyu Chen, Zhaocheng He, Lijun Sun (2019). A Bayesian tensor decomposition approach for spatiotemporal traffic data imputation. *Transportation Research Part C: Emerging Technologies*. 98: 73-84.

```
    https://doi.org/10.1016/j.trc.2018.11.003
    JCR-Q1
    IF: 9.022
    top-tier
    190+ citations
    ESI highly cited paper (top 1%)
```

1. Xinyu Chen, Zhaocheng He, Jiawei Wang (2018). Spatial-temporal traffic speed patterns discovery and incomplete data recovery via SVD-combined tensor decomposition. *Transportation Research Part C: Emerging Technologies*. 86: 59-77.

- ♦ Co-author papers
- 3. Lijun Sun, Xinyu Chen, Zhaocheng He, Luis F. Miranda-Moreno (2021). Routine pattern discovery and anomaly detection in individual travel behavior. *Networks and Spatial Economics*. 35.

```
http://dx.doi.org/10.1007/s11067-021-09542-9
```

**2**. Pu Ren, Xinyu Chen, Lijun Sun, Hao Sun (2021). Incremental Bayesian matrix/tensor learning for structural monitoring data imputation and response forecasting. *Mechanical System and Signal Processing*. 158: 107734.

```
https://doi.org/10.1016/j.ymssp.2021.107734

JCR-Q1 ■ IF: 8.934 ▼ 10+ citations
```

1. Zhaocheng He, Kaiying Chen, Xinyu Chen (2018). A collaborative method for route discovery using taxi drivers' experience and preferences. *IEEE Transactions on Intelligent Transportation Systems*. 19 (8): 2505-2514.

```
http://doi.org/10.1109/TITS.2017.2753468
$ JCR-Q1
IF: 9.551
Q top-tier
$ 20+ citations
```

Conference TRB 2023: Xinyu Chen, Chengyuan Zhang, Lijun Sun, Nicolas Saunier (2023). Nonstationary temporal matrix factorization for sparse traffic time series forecasting. The 102nd Annual Meeting of Transportation Research Board.

**KDD Time Series Workshop**: Xinyu Chen, Mengying Lei, Nicolas Saunier, Lijun Sun (2021). Lowrank autoregressive tensor completion for spatiotemporal traffic data imputation. *The 7th SIGKDD Workshop on Mining and Learning from Time Series* (*MiLeTS*).



- 4. Xinyu Chen, Zhanhong Cheng, Nicolas Saunier, Lijun Sun (2022). Laplacian convolutional representation for traffic time series imputation. arXiv: 2212.01529.
  - iii IEEE Transactions on Signal Processing □ under review (1st round)
- 3. Xinyu Chen, Chengyuan Zhang, Xiaoxu Chen, Nicolas Saunier, Lijun Sun (2022). Discovering dynamic patterns from spatiotemporal data with time-varying low-rank autoregression. arXiv: 2211.15482.
  - iii IEEE Transactions on Knowledge and Data Engineering IEEE Transactions on Knowledge and Data Engineering
- 2. Xinyu Chen, Chengyuan Zhang, Xi-Le Zhao, Nicolas Saunier, Lijun Sun (2022). Nonstationary temporal matrix factorization for multivariate time series forecasting. arXiv: 2203.10651.
- 1. <u>Xinyu Chen</u>, Lijun Sun (2020). Low-rank autoregressive tensor completion for multivariate time series forecasting. arXiv: 2006.10436.

₹ 10+ citations

#### ACADEMIC FUNDING

- 1. City-Scale Traffic Data Imputation and Forecasting with Tensor Learning
  - Authors: Xinyu Chen, Nicolas Saunier (advisor)
  - Link: https://ivado.ca/en/scholarships-and-grants/phd-excellence-scholarships/
  - ♀ IVADO PhD Excellence Scholarship \$100,000 ■ September 1, 2020

# Reviewing Activities

I am serving as a reviewer for **10+** scientific journals.

- Applied Intelligence
- Big Data Research
- Expert Systems with Applications
- IEEE Intelligent Transportation Systems Magazines
- IEEE Open Journal of Signal Processing
- IEEE Sensors Journal
- IEEE Transactions on Intelligent Transportation Systems
- IEEE Transactions on Knowledge and Data Engineering
- INFORMS Journal on Computing

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- Scientific Reports
- Transportmetrica B: Transport Dynamics
- Transportation Research Part B: Methodological
- Transportation Research Part C: Emerging Technologies

Profes-☐ Interuniversity Research Centre on Enterprise **Student Member** 2021 - present Networks, Logistics and Transportation (CIRRELT) SIONAL Member-☐ Institute of Electrical and Electronics Engineers (IEEE) **Student Member** 2022 - present **SHIPS** OPEN-I am leading some innovative projects on GitHub (3.2k+ stars & 600+ forks & 450+ followers). Source Selected repositories **PROJECTS transdim**: Python codes for spatiotemporal data imputation and 2018.09 - present prediction using a variety of state-of-the-art machine learning and deep learning models.

☆ 950+ stars

	awesome-LaTeX-drawing: Drawing Bayesian networks, grap tensor structures, and technical frameworks in LaTeX. (Most from our research papers.)				
	$\bigcirc$ xinychen/awesome-latex-drawing $\bigcirc$ 1k+ stars				
	■ LaTeX-cookbook: Academic writing with LaTeX: A tutorial (	(in Chinese). 2021.05 - present			
	xinychen/latex-cookbook				
	• awesome-beamer: Creating presentation slides by using Beam (Most examples are from our research.)	mer in LaTeX. 2020.11 - present			
	xinychen/awesome-beamer 🏠 60+ stars				
	<b>Tracebase</b> : Multivariate time series forecasting on high-dime sparse Uber movement speed data.	ensional and 2020.11 - present			
	xinychen/tracebase 🖒 30+ stars				
Presenta- tion & Talk	☐ Low-rank matrix and tensor methods for spatiotemporal data modeling. 2023.04				
	<ul> <li>Sichuan University</li> <li>University of Electronic Science and Technology of China</li> <li>Slides: https://xinychen.github.io/slides/stdata_modeling.pdf</li> </ul>				
	☐ Low-rank matrix and tensor factorization for speed field reconstruction. 2023.03				
	<ul><li>Research Group of Transport, Polytechnique Montreal</li><li>Slides: https://xinychen.github.io/slides/MF_TF_SFR.pdf</li></ul>				
	<ul> <li>□ Spatiotemporal traffic data imputation and forecasting with tensor learning.</li> <li>2022.05</li> <li>• IVADO Project Workshop</li> <li>• Slides: https://xinychen.github.io/slides/phd_project_22summer.pdf</li> </ul>				
	☐ Nonstationary temporal matrix factorization for multivariate time series forecasting. 2022.05				
	<ul> <li>Hong Kong Machine Learning Meetup (virtual)</li> <li>Slides: https://xinychen.github.io/slides/notmf.pdf</li> </ul>	O			
	<ul> <li>□ Bayesian temporal factorization for multidimensional time series prediction.</li> <li>• IFT 6760A Course (<i>Matrix and tensor factorization techniques for machine learning</i>)</li> <li>• Slides: https://doi.org/10.5281/zenodo.4693404</li> </ul>				
BLOG POSTS I enjoy writing some blog posts about my research (30+ posts & 65k+ views & 300+ followers on Medium).   M https://medium.com/@xinyu.chen  ◆ Selected posts					
	<ol><li>Temporal matrix factorization for multivariate time series forecasting.</li></ol>	4k+ views 2022.03.20			
	<ol><li>Reduced-rank vector autoregressive model for high-dimensional time series forecasting.</li></ol>	4k+ views 2021.10.16			
	<b>3</b> . Dynamic mode decomposition for multivariate time series forecasting.	14k+ views 2021.10.10			
	<ol><li>Matrix autoregressive model for multidimensional time series forecasting.</li></ol>	8k+ views 2021.10.03			
	<ol> <li>Intuitive understanding of randomized singular value decomposition.</li> </ol>	8k+ views 2020.07.01			
Skills	☐ Language: Chinese (native) & English (fluent)				
	☐ <b>Expertise</b> : Python/Matlab/Julia/R/Java; NumPy/PyTorch/Cupy; Jupyter Notebook; CSS/HTML.				

#### **References** Please reach out to request a reference letter.

## **Prof. Nicolas Saunier** (advisor)

- Full Professor
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## **Prof. Xi-Le Zhao** (collaborator)

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- University of Electronic Science and Technology of China
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- Email: xlzhao122003@163.com