Current						
RESEARCH INTERESTS	☐ Machine Learning☐ Matrix/Tensor Computations☐ Low-Rank Models	Spatiotemporal Data ModelingMissing Data ImputationTime Series Analysis	Intelligent TransportationSmart CitiesHuman Mobility			
Contact	□ chenxy346@gmail.com					
Information	N https://xinychen.github	.io (homepage)				
	xinychen chenxy346					
	· ·	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		2020.08 - 2023.08 (expected) Montreal, Canada			
	♀ IVADO 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 l	nformation Engineering & Contro	2016.08 - 2019.06 Guangzhou, China			
	Q <i>Outstanding Thesis Award</i> (top 2% in total)					
	 Thesis: Imputing Spatiotemporal Missing Traffic Data by Bayesian Tensor Factorization Models Advisor: Zhaocheng He (full professor) 					
	Bachelor's degree in Traffic Guangzhou University	c Engineering	2012.09 - 2016.06 Guangzhou, China			
	Thesis: Modeling Vehicles' ?Advisor: Xiaodong Zang (Time Headway with Log-Normal and I full professor)	Power-Law Distribution			
Honours	♀ CIRRELT PhD Excellence Scho	larship (\$5,000)	2021.12			
AND		rship (\$100,000, by Institute for Dat				
Awards	Q Outstanding Thesis Award (by		2019.06			
	Q <i>National Scholarship</i> (by Mini	stry of Education of China)	2018.11			
Refereed	Google Scholar: https://scholar.google.com/citations?user=mCrWO4wAAAAJ&hl					
Journal Papers	♦ First-author papers					
	7. Xinyu Chen, Lijun Sun (2022). Bayesian temporal factorization for multidimensional time series prediction. <i>IEEE Transactions on Pattern Analysis and Machine Intelligence</i> . 44 (9): 4659-4673.					
	https://doi.org/10.1109/TPAMI.2021.3066551					
	S JCR-Q1 ■ IF: 24.314 Q top-tier 90+ citations					
	♦ ESI hot paper (top 0.1%) ▼ ESI highly cited paper (top 1%)					
	6. Xinyu Chen, Mengying Lei, Nicolas Saunier, Lijun Sun (2022). Low-rank autoregressive tensor completion for spatiotemporal traffic data imputation. <i>IEEE Transactions on Intelligent Transportation Systems</i> . 23 (8): 12301-12310.					
	https://doi.org/10.1109/					
	★ ICD O1 ■ IE. 0 FF1	O ton tion of 20 Laitations A	LICI bot manor /to 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.

```
https://doi.org/10.1016/j.trc.2019.03.003
$\int \text{ICR-Q1} \text{ IF: 9.022} \text{ top-tier} \text{ $\infty 80+ citations}$
```

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
    180+ 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 70+ 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.
 - ii 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.
 - 苗 IEEE Transactions on Knowledge and Data Engineering under review (1st round)
- 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.
 - 🛂 major revision (1st round) **Transportation Research Part C: Emerging Technologies**
- 1. Xinyu Chen, 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

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

Profes- SIONAL	☐ Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT)	Student Member	2021 - present		
Member- ships	☐ Institute of Electrical and Electronics Engineers (IEEE)	Student Member	2022 - present		
OPEN- SOURCE PROJECTS	I am leading some innovative projects on GitHub (3k+ stars & 400+ followers). ◆ Selected repositories				
	Transdim : Python codes for spatiotemporal data imput prediction using a variety of state-of-the-art machine learning models.	2018.09 - present			
	🗘 xinychen/transdim 🗘 900+ stars				

	■ awesome-LaTeX-drawing: Drawing Bayesian networks, grap tensor structures, and technical frameworks in LaTeX. (Most from our research papers.)		2019.06 - present			
	xinychen/awesome-latex-drawing \$\frac{1}{12}\$ 1k+ stars					
	☑ LaTeX-cookbook: Academic writing with LaTeX: A tutorial (in Chinese).	2021.05 - present			
	🕥 xinychen/latex-cookbook 🌣 600+ stars					
	■ awesome-beamer: Creating presentation slides by using Beam (Most examples are from our research.)	mer in LaTeX.	2020.11 - present			
	\bigcirc xinychen/awesome-beamer \Leftrightarrow 60+ stars					
	tracebase: Multivariate time series forecasting on high-dimensional and 2020.11 - present sparse Uber movement speed data.					
	🗘 xinychen/tracebase 🌣 30+ stars					
Presenta- tion & Talk	□ Low-rank matrix and tensor factorization for speed field reconstruction. 2023.03 • Research Group of Transport, Polytechnique Montreal • Slides: https://xinychen.github.io/slides/MF_TF_SFR.pdf					
	☐ Spatiotemporal traffic data imputation and forecasting with tensor learning. 2022.05 • IVADO Project Workshop • Slides: https://xinychen.github.io/slides/phd_project_22summer.pdf					
	☐ Nonstationary temporal matrix factorization for multivariate time series forecasting. 2022.05					
	 Hong Kong Machine Learning Meetup (virtual) Slides: https://xinychen.github.io/slides/notmf.pdf 					
	☐ Bayesian temporal factorization for multidimensional time series prediction. 2021.03					
	 IFT 6760A Course (Matrix and tensor factorization techniques for machine learning) Slides: https://doi.org/10.5281/zenodo.4693404 					
BLOG POSTS I enjoy writing some blog posts about my research (30+ posts & 60k+ views & 280+ followers on Medium). M https://medium.com/@xinyu.chen ◆ Selected posts						
	Temporal matrix factorization for multivariate time series forecasting.	4k+ views	2022.03.20			
	Reduced-rank vector autoregressive model for high-dimensional time series forecasting.	4k+ views	2021.10.16			
	3 . Dynamic mode decomposition for multivariate time series forecasting.	14k+ views	2021.10.10			
	2. Matrix autoregressive model for multidimensional time series forecasting.	8k+ views	2021.10.03			
	 Intuitive understanding of randomized singular value decomposition. 	8k+ views	2020.07.01			
Skills	☐ Language: Chinese (native) & English (fluent)					
	☐ Expertise : Python/Matlab/Julia/R/Java; NumPy/PyTorch/CSS/HTML.	Cupy; Jupyter	Notebook; LaTeX;			

References Please reach out to request a reference letter.

Prof. Nicolas Saunier (advisor)

- Full Professor
- Département des génies civil, géologique et des mines (CGM)
- Polytechnique Montréal
- CIRRELT, RRSR, CIRODD & IVADO
- Homepage: http://n.saunier.free.fr/saunier/
- Email: nicolas.saunier@polymtl.ca

Prof. Lijun Sun (co-advisor)

- Assistant Professor
- Department of Civil Engineering
- McGill University
- Homepage: https://lijunsun.github.io
- Email: lijun.sun@mcgill.ca

Prof. Xi-Le Zhao (collaborator)

- Full Professor
- School of Mathematical Science
- University of Electronic Science and Technology of China
- Homepage: https://zhaoxile.github.io
- Email: xlzhao122003@163.com