Machine LearningMatrix/Tensor ComputationsLow-Rank Models	 Spatiotemporal Data Modeling Missing Data Imputation Time Series Analysis 	☐ Intelligent Transportation☐ Smart Cities☐ Human Mobility
xinychen chenxy346		
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.		
Polytechnique Montreal, <i>University of Montreal</i> **Polytechnique Montreal, <i>University of Montreal</i> **Polytechnique Montreal, <i>University of Montreal</i> **Polytechnique Montreal, <i>Visional Section of Montreal of Institute of Institute of Institute of Montreal of Institute of Insti</i>		ontreal)
Thesis: <i>Imputing Spatiotemp</i>Advisor: Zhaocheng He (fu	ooral Missing Traffic Data by Bayesian ull professor)	
Guangzhou UniversityThesis: Modeling Vehicles' T	ime Headway with Log-Normal and I	2012.09 - 2016.06 Guangzhou, China Power-Law Distribution
Q <i>IVADO PhD Excellence Scholar</i> Q <i>Outstanding Thesis Award</i> (by	ship (\$100,000, by Institute for Dat Sun Yat-Sen University)	2021.12 2020.04 2019.06 2018.11
 First-author papers 7. Xinyu Chen, Lijun Sun (2022). prediction. IEEE Transactions of https://doi.org/10.1109/T JCR-Q1 IF: 24.314 6. Xinyu Chen, Mengying Lei, Note to completion for spatiotemporal systems. 23 (8): 12301-12310. 	Bayesian temporal factorization for Pattern Analysis and Machine Interpand . 2021 . 3066551 top-tier 90+ citations factorization for Pattern Analysis and Machine Interpand . 2021 . 3066551 traffic data imputation. IEEE Transaction.	or multidimensional time series alligence. 44 (9): 4659-4673. ESI highly cited paper (top 1%) Low-rank autoregressive tensor
	☐ Matrix/Tensor Computations ☐ Low-Rank Models ☐ chenxy346@gmail.com ☐ https://xinychen.github. ☐ xinychen ☐ chenxy346 ☐ Google Scholar 620 citation In Summer 2023, I will finish my IVADO PhD Excellence Scholars ☐ focuses on machine learning, spa ☐ PhD in Civil Engineering (☐ Polytechnique Montreal, Unit ☐ IVADO PhD Excellence Scholar ☐ Thesis: Spatiotemporal Traffic ☐ Advisor: Nicolas Saunier (☐ Co-advisor: Lijun Sun (ass) ☐ Master's degree in Traffic In ☐ Sun Yat-Sen University ☐ Outstanding Thesis Award (top ☐ Thesis: Imputing Spatiotemp ☐ Advisor: Zhaocheng He (fin) ☐ Bachelor's degree in Traffic ☐ Guangzhou University ☐ Thesis: Modeling Vehicles' In ☐ Advisor: Xiaodong Zang (fin) ☐ CIRRELT PhD Excellence Scholar ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by ☐ National Scholarship (by Minis) ☐ Outstanding Thesis Award (by Dinis) ☐ National Scholarship (by Minis) ☐ National Scholarship	Matrix/Tensor Computations

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.

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https://doi.org/10.1016/j.trc.2019.03.003
$\int \text{ICR-Q1}$ IF: 9.022  \text{\text{$\text{$\text{$\text{top-tier}}$}} \text{\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\text{$\texitt{$\text{$\}\exititx{$\text{$\exitit{$\text{$\}$}}$}}}}$} \text{$\text{$\text{$\text{$\text{$\e
```

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.

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    https://doi.org/10.1016/j.trc.2018.11.003
    JCR-Q1
    IF: 9.022
    top-tier
    170+ 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
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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*).



- 5. Xinyu Chen, Zhanhong Cheng, Nicolas Saunier, Lijun Sun (2022). Laplacian convolutional representation for traffic time series imputation. arXiv: 2212.01529.
 - i IEEE Transactions on Signal Processing □ under review (1st round)
- 4. Xinyu Chen, Zhanhong Cheng, Chengyuan Zhang, Lijun Sun, Nicolas Saunier (2022). Convolutional matrix factorization with delay embedding.
 - iii International Conference on Machine Learning (ICML 2023) under review
- 3. Xinyu Chen, Chengyuan Zhang, Xiaoxu Chen, Nicolas Saunier, Lijun Sun (2022). Discovering interpretable modes from time-varying spatiotemporal data. arXiv: 2211.15482.
 - iii 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.
 - ## Transportation Research Part C: Emerging Technologies under review (1st round)
- 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

PROFESSIONAL Networks, Logistics and Transportation (CIRRELT)

MEMBERSHIPS

Institute of Electrical and Electronics Engineers (IEEE) Student Member 2022 - present

SOURCE

Source Sequence on Enterprise Student Member 2021 - present

Student Member 2022 - present

Source Sequence innovative projects on GitHub (3,000+ stars & 400+ followers).

- Source Projects
- **♦** Selected repositories
 - **transdim**: Python codes for spatiotemporal data imputation and prediction using a variety of state-of-the-art machine learning and deep learning models.
 - xinychen/transdim \$\frac{1}{2}\$ 900+ stars

	■ awesome-LaTeX-drawing: Drawing Bayesian networks, graphical models, tensor structures, and technical frameworks in LaTeX. (Most examples are from our research papers.)			
	\bigcirc xinychen/awesome-latex-drawing $\qquad \stackrel{\bullet}{\Omega} \qquad 950 + stars$			
	 □ LaTeX-cookbook: Academic writing with LaTeX: A tutorial (in Chinese). 2021.05 - present □ xinychen/latex-cookbook □ 600+ stars 			
	🗘 xinychen/awesome-beamer 🕏 60+ stars			
	tracebase: Multivariate time series forecasting on high-dimensional and 2020.11 - present sparse Uber movement speed data.			
	xinychen/tracebase			
Presenta- tion & Talk	☐ 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. • IFT 6760A Course (<i>Matrix and tensor factorization techniques for machine learning</i>) • Slides: https://doi.org/10.5281/zenodo.4693404 			
Blog Posts	I enjoy writing some blog posts about my research (30+ posts & 60,000+ views & 280+ followers on Medium). $\[Mathbb{M}\]$ https://medium.com/@xinyu.chen			
	♦ Selected posts			
	5. Temporal matrix factorization for multivariate time series 4,000+ views 2022.03.20 forecasting.			
	4. Reduced-rank vector autoregressive model for 4,000+ views 2021.10.16 high-dimensional time series forecasting.			
	3 . Dynamic mode decomposition for multivariate time series 13,000+ views 2021.10.10 forecasting.			
	2. Matrix autoregressive model for multidimensional time 8,000+ views 2021.10.03 series forecasting.			
	1. Intuitive understanding of randomized singular value 8,000+ views 2020.07.01 decomposition.			
Skills	☐ Language: Chinese (native) & English (fluent)			
	☐ Expertise : Python/Matlab/Julia/R/Java; NumPy/PyTorch/Cupy; Jupyter Notebook; LaTeX; CSS/HTML.			

References Please reach out to request a reference letter.

Prof. Nicolas Saunier (advisor)

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Prof. Xi-Le Zhao (collaborator)

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- School of Mathematical Science
- University of Electronic Science and Technology of China
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