CURRENT RESEARCH INTERESTS	<ul> <li>☐ Machine Learning</li> <li>☐ AI for Science</li> <li>☐ Matrix/Tensor Computations</li> </ul>	<ul><li>☐ Spatiotemporal Data Modeling</li><li>☐ Data Science</li><li>☐ Time Series Analysis</li></ul>	<ul><li>□ Urban Science</li><li>□ Mobility &amp; Smart Cities</li><li>□ Decision Making</li></ul>	3		
Contact Information	chenxy346@gmail.com  https://xinychen.github. xinychen Google Scholar 7 1038 cita	io (homepage, 12k+ visitors) tions (h-index: 11 & i10-index: 12)				
Biography	Postdoctoral Associate at MIT's Department of Urban Studies and Planning (DUSP) with Pro Jinhua Zhao, working on the Mens, Manus, and Machina (M3S) project and the US Department of Energy (DOE) project.					
Education	PhD in Civil Engineering ( Polytechnique Montreal (Schof Montreal	2020.08 – 20 Montreal, Ca				
	<ul> <li>IVADO PhD Excellence Scholarship &amp; CIRRELT PhD Excellence Scholarship</li> <li>Thesis: Matrix and Tensor Models for Spatiotemporal Traffic Data Imputation and Forecasting</li> <li>Advisor: Nicolas Saunier (full professor at Polytechnique Montreal)</li> <li>Co-advisor: Lijun Sun (associate professor at McGill University)</li> </ul>					
	★ Master's degree in Traffic I ★ Sun Yat-Sen University	2016.08 – 201 Guangzhou, C				
	Q Outstanding Thesis Award (top 2% in total)					
	<ul> <li>Thesis: Imputing Spatiotemporal Missing Traffic Data by Bayesian Tensor Factorization Models</li> <li>Advisor: Zhaocheng He (full professor)</li> </ul>					
	Bachelor's degree in Traffic   Guangzhou University	2012.09 – 201 Guangzhou, C				
	<ul><li>Thesis: Modeling Vehicles' 7</li><li>Advisor: Xiaodong Zang (</li></ul>	Time Headway with Log-Normal and I full professor)	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 Minist</li> </ul>	rship (\$100,000, by Institute for Dat Sun Yat-Sen University)	a Valorisation) 202 202	21.12 20.04 19.06 18.11		
Refereed	Google Scholar: https://scholar.google.com/citations?user=mCrWO4wAAAAJ&hl					
Journal Papers	◆ First-author papers (5 papers cited above 100 times)					
	8. Xinyu Chen, Chengyuan Zhang, Xiaoxu Chen, Nicolas Saunier, Lijun Sun (2024). <b>Discovering</b> dynamic patterns from spatiotemporal data with time-varying low-rank autoregression. <i>IEEE</i> Transactions on Knowledge and Data Engineering. 36 (2): 504–517.					
	<pre>     https://doi.org/10.1109/TKDE.2023.3294440</pre>					
	series prediction. IEEE Transa	2). <b>Bayesian temporal factorization</b> actions on Pattern Analysis and Machin				
		IPAMI. 2021. 3066551  top-tier				

**♦** 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. *IEEE Transactions on Intelligent Transportation Systems*. 23 (8): 12301–12310.

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.

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bhttps://doi.org/10.1016/j.trc.2020.102673
$\int JCR-Q1$
$\int IF: 8.3$
$\int \text{ top-tier}$
$\int 100 + \text{ citations}$
```

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.

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.

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    https://doi.org/10.1016/j.trc.2017.10.023
    JCR-Q1
    IF: 8.3
    top-tier
    100+ citations
```

- ♦ Co-author papers
- 4. Ben-Zheng Li, Xi-Le Zhao, Xiongjun Zhang, Teng-Yu Ji, Xinyu Chen, Michael K. Ng (2023). A learnable group-tube transform induced tensor nuclear norm and its application for tensor completion. SIAM Journal on Imaging Sciences. 16 (3): 1370–1397.
  - http://dx.doi.org/10.1137/22M1531907
- 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
- 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

CONFERENCE WCTR 2023: Xinyu Chen, Zhanhong Cheng, Nicolas Saunier, Lijun Sun (2023). Laplacian convolutional representation for traffic time series imputation (presentation only). Proceedings of the World Conference of Transport Research.

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

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

# SUBMITTED PAPERS

2. Xinyu Chen, Xi-Le Zhao, Chun Cheng (2024). Forecasting urban traffic states with sparse data using Hankel temporal matrix factorization.

**iii** INFORMS Journal on Computing **♦** UTD-24

1. Xinyu Chen, Zhanhong Cheng, HanQin Cai, Nicolas Saunier, Lijun Sun (2024). **Laplacian convolutional representation for traffic time series imputation**.

Imminor revision (2nd round)

**ii** IEEE Transactions on Knowledge and Data Engineering **under review** (1st round)

#### 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/

# REVIEWING ACTIVITIES

I am serving as a reviewer for some scientific journals.

- IEEE Open Journal of Signal Processing
- IEEE Transactions on Intelligent Transportation Systems
- IEEE Transactions on Knowledge and Data Engineering
- INFORMS Journal on Computing
- Scientific Reports
- Transportation Research Part B: Methodological
- Transportation Research Part C: Emerging Technologies
- Transportation Research Part E: Logistics and Transportation Review

PROFESSIONAL
Networks, Logistics and Transportation (CIRRELT)

MEMBERSHIPS

□ Interuniversity Research Centre on Enterprise
Networks, Logistics and Transportation (CIRRELT)

Student Member
2021 – 2023

Student Member
2022 – 2023

Student Member
2022 – 2023

I am leading some innovative projects on GitHub (4.2k+ stars & 600+ forks & 500+ followers).

#### OPEN-SOURCE PROJECTS

- **♦** Selected repositories
  - **Transdim**: Python codes for spatiotemporal data imputation and prediction using a variety of state-of-the-art machine learning (mainly including low-rank matrix and tensor methods) and deep learning.
  - **awesome-LaTeX-drawing**: Drawing Bayesian networks, graphical models, 2019.06 present tensor structures, and technical frameworks in LaTeX.
    - xinychen/awesome-latex-drawing \( \frac{1.2k+ stars}{2} \)
  - **⚠ LaTeX-cookbook**: Academic writing with LaTeX: A tutorial (in Chinese). 2021.05 present Published in *Tsinghua University Press*.

		completion, and tensor regression techniques.	- present			
		🗘 xinychen/tensor-learning 💢 150+ stars				
	0	<b>awesome-beamer</b> : Creating presentation slides by using Beamer in LaTeX. 2020.11	- present			
		🕠 xinychen/awesome-beamer 🌣 90+ stars				
		sparse Uber movement speed data.	- present			
		🗘 xinychen/tracebase 🗘 40+ stars				
Presenta- tion & Talk	•	Matrix and Tensor Models for Spatiotemporal Traffic Data Imputation and Forecasting. PhD Research Defense Montreal, Canada	2023.12			
		Slides: https://xinychen.github.io/slides/defense.pdf				
		Laplacian convolutional representation for traffic data imputation.	2023.07			
		World Conference of Transport Research (WCTR 2023) Montreal, Canada				
		Slides: https://xinychen.github.io/slides/LCR.pdf				
		Low-rank matrix and tensor methods for spatiotemporal traffic data modeling.	2023.05			
		Southern University of Science and Technology (SUSTech)				
		Shenzhen, China Slides: https://xinychen.github.io/slides/traffic_data_modeling_v1.pdf				
		Low-rank matrix and tensor methods for spatiotemporal data modeling.	2023.04			
	<ul> <li>Sichuan University (SCU)</li> <li>University of Electronic Science and Technology of China (UESTC)</li> <li>Chengdu, China</li> </ul>					
		Slides: https://xinychen.github.io/slides/stdata_modeling.pdf	2023.03			
	•	<ul> <li>Research Group of Transport, Polytechnique Montreal</li> <li>Montreal, Canada</li> </ul>				
	•	Slides: https://xinychen.github.io/slides/MF_TF_SFR.pdf				
		Spatiotemporal traffic data imputation and forecasting with tensor learning.	2022.05			
	•	<pre>IVADO Project Workshop Montreal, Canada Slides: https://xinychen.github.io/slides/phd_project_22summer.pdf</pre>				
		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				
Skills		Language: Chinese (native) & English (fluent)				
	☐ <b>Expertise</b> : Python/Matlab/Julia/R/Java; NumPy/PyTorch/CuPy; Jupyter Notebook; LaTeX, CSS/HTML.					

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

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