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>	<ul><li>Intelligent Transportation</li><li>Smart Cities</li><li>Human Mobility</li></ul>			
Contact	✓ chenxy346@gmail.com					
INFORMATIO	NA https://xinychen.github () xinychen () chenxy346 () Google Scholar () 620 citati	.io (homepage)  tons (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	<ul><li>➢ PhD in Civil Engineering (Transportation)</li><li>⚠ Polytechnique Montreal, University of Montreal</li></ul>		2020.08 - 2023.08 (expected) Montreal, Canada			
	♀ IVADO PhD Excellence Scholarship & CIRRELT PhD Excellence Scholarship					
	<ul> <li>Thesis: Spatiotemporal Traffic Data Imputation and Forecasting with Low-Rank Models</li> <li>Advisor: Nicolas Saunier (full professor at Polytechnique Montreal)</li> <li>Co-advisor: Lijun Sun (assistant professor at McGill University)</li> </ul>					
	► Master's degree in Traffic I  ☐ Sun Yat-Sen University	Information Engineering & Contro	2016.08 - 2019.06 Guangzhou, China			
	• 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	c Engineering	2012.09 - 2016.06 Guangzhou, China			
	<ul><li>Thesis: Modeling Vehicles' ?</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 Ministra)</li> </ul>	rship (\$100,000, by Institute for Dat Sun Yat-Sen University)	2021.12 2020.04 2019.06 2018.11			
Refereed Journal Papers	Google Scholar: https://scholar.google.com/citations?user=mCrWO4wAAAAJ&hl					
	♦ First-author papers					
	7. <u>Xinyu Chen</u> , 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.					
	<pre></pre>		' 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.					
	<pre></pre>		ESI hot paper (top 0.1%)			

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.

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

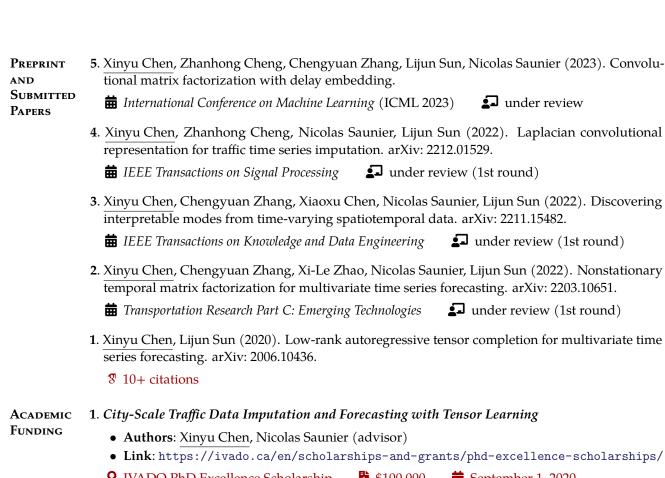
JCR-Q1 ■ IF: 8.934 ▼ 10+ citations
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1. Zhaocheng He, Kaiying Chen, Xinyu Chen (2018). A collaborative method for route discovery using taxi drivers' experience and preferences. *IEEE Transactions on Intelligent Transportation Systems*. 19 (8): 2505-2514.

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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*).



- \$100,000 ♀ IVADO PhD Excellence Scholarship **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 Memberships	<ul> <li>□ Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT)</li> <li>□ Institute of Electrical and Electronics Engineers (IEEE)</li> </ul>	Student Member	r	
OPEN- SOURCE PROJECTS	I am leading some innovative projects on GitHub (3,000+ stars & 400+ followers).  ◆ Selected repositories			
	transdim: Python codes for spatiotemporal data imput prediction using a variety of state-of-the-art machine le learning models.	2018.09 - present		
	xinychen/transdim 🌣 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 $\qquad \stackrel{\bullet}{\Omega} \qquad 950 + stars$					
	<ul> <li>□ LaTeX-cookbook: Academic writing with LaTeX: A tutorial (in Chinese).</li> <li>2021.05 - present</li> <li>□ xinychen/latex-cookbook</li> <li>□ 600+ stars</li> </ul>					
	■ awesome-beamer: Creating presentation slides by using Beamer in LaTeX. 2020.11 - present (Most examples are from our research.)					
	🗘 xinychen/awesome-beamer 🏗 60+ stars					
	<b>tracebase</b> : Multivariate time series forecasting on high-dimensional and sparse Uber movement speed data.					
	xinychen/tracebase					
Presenta- tion & Talk	<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>					
	<ul> <li>Nonstationary temporal matrix factorization for multivariate time series forecasting. 2022.05</li> <li>Hong Kong Machine Learning Meetup (virtual)</li> <li>Slides: https://xinychen.github.io/slides/notmf.pdf</li> </ul>					
	<ul> <li>□ Bayesian temporal factorization for multidimensional time series prediction.</li> <li>2021.03</li> <li>IFT 6760A Course (Matrix and tensor factorization techniques for machine learning)</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 & 60,000+ views & 280+ followers or Medium). ■ 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.					
	<b>3</b> . 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)					
	☐ <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.

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

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

# **Prof. Lijun Sun** (co-advisor)

- Assistant Professor
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- 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