CURRENT RESEARCH INTERESTS	 ☐ Machine Learning ☐ Matrix/Tensor Computations ☐ Low-Rank Models ☐ Spatiotemporal Data Modeling ☐ Missing Data Imputation ☐ Smart Cities ☐ Human Mobility
CONTACT INFORMATION	chenxy346@gmail.com https://xinychen.github.io (homepage) xinychen chenxy346 Google Scholar 8 629 citations (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 system.
Education	PhD in Civil Engineering (Transportation) Polytechnique Montreal, University of Montreal 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 Information Engineering & Control Sun Yat-Sen University Guangzhou, Chin
	 Outstanding Thesis Award (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 Engineering ■ Guangzhou University ■ Thesis: Modeling Vehicles' Time Headway with Log-Normal and Power-Law Distribution ■ Advisor: Xiaodong Zang (full professor)
Honours and Awards	 CIRRELT PhD Excellence Scholarship (\$5,000) IVADO PhD Excellence Scholarship (\$100,000, by Institute for Data Valorisation) Outstanding Thesis Award (by Sun Yat-Sen University) National Scholarship (by Ministry of Education of China)
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 serior 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
	 ttps://doi.org/10.1109/TITS.2021.3113608 JCR-Q1 IF: 9.551 top-tier 20+ citations 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.

```
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.

```
    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

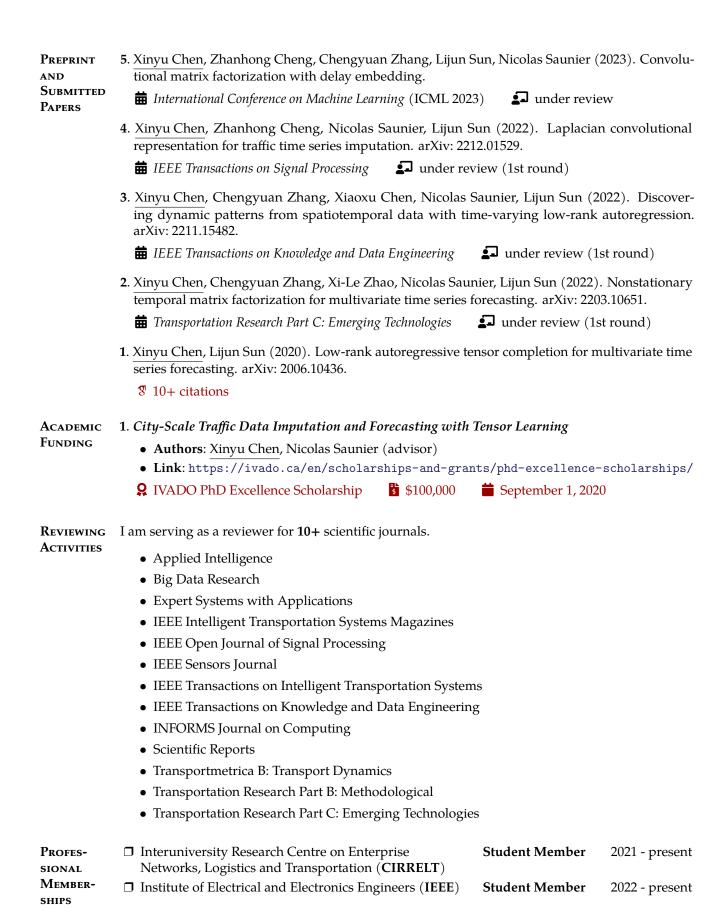
JCR-Q1 ■ IF: 8.934 ▼ 10+ citations
```

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*).



OPEN-Source **PROJECTS**

I am leading some innovative projects on GitHub (3,000+ stars & 400+ followers).

- Selected repositories
 - **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.
 - xinychen/transdim ☆ 900+ stars

xinychen/latex-cookbook

- **awesome-LaTeX-drawing**: Drawing Bayesian networks, graphical models, 2019.06 - present tensor structures, and technical frameworks in LaTeX. (Most examples are from our research papers.)
 - xinychen/awesome-latex-drawing ☆ 950+ stars
- ☑ LaTeX-cookbook: Academic writing with LaTeX: A tutorial (in Chinese). 2021.05 - present ☆ 600+ stars
- **awesome-beamer**: Creating presentation slides by using Beamer in LaTeX. 2020.11 present (Most examples are from our research.)
 - xinychen/awesome-beamer ☆ 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

- 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 & 60,000+ views & 280+ followers on 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.
 - 3. Dynamic mode decomposition for multivariate time series 2021.10.10 13,000+ views 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)

- 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