| <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>  | ☐ Intelligent Transportation☐ Smart Cities☐ Human Mobility  |  |  |
|---|--|---|--|--|
| nttps://github.com/xinyc<br>chenxy346   | hen  |   |  |  |
| In Summer 2023, I will finish my PhD at University of Montreal (UdeM), with support from th IVADO PhD Excellence Scholarship and the CIRRELT PhD Excellence Scholarship. My PhD researce focuses on machine learning, spatiotemporal data modeling, and intelligent transportation system |  |   |  |  |
| Polytechnique Montreal, Uni  Value IVADO PhD Excellence Scholar  Thesis: Spatiotemporal Traffi  Advisor: Nicolas Saunier (  | ith Low-Rank Models<br>ontreal)  |   |  |  |
| Master's degree in Traffic In  ■ Sun Yat-Sen University  Outstanding Thesis Award (top  • Thesis: Imputing Spatiotemp   | nformation Engineering & Contro<br>2% in total)  ooral Missing Traffic Data by Bayesian  | 2016.08 - 2019.06<br>Guangzhou, China   |  |  |
| Bachelor's degree in Traffic   Guangzhou University Thesis: Modeling Vehicles' T  | Engineering  Time Headway with Log-Normal and F  | 2012.09 - 2016.06<br>Guangzhou, China<br>h Log-Normal and Power-Law Distribution  |  |  |
| <b>Q</b> IVADO PhD Excellence Scholar <b>Q</b> Outstanding Thesis Award (by   | ship (\$100,000, by Institute for Data<br>Sun Yat-Sen University)  | 2021.12<br>a Valorisation) 2020.04<br>2019.06<br>2018.11  |  |  |
| <ul> <li>First-author papers</li> <li>7. Xinyu Chen, Lijun Sun (2022) prediction. IEEE Transactions of https://doi.org/10.1109/T    JCR-Q1 ■ IF: 24.314</li> <li>6. Xinyu Chen, Mengying Lei, No.</li> </ul>  | Bayesian temporal factorization for <i>Pattern Analysis and Machine Intell</i> PAMI . 2021 . 3066551  top-tier 880+ citations  ficolas Saunier, Lijun Sun (2022). I  | or multidimensional time series <i>lligence</i> . 44 (9): 4659-4673.  ESI highly cited paper (top 1%)   |  |  |
|   | □ Matrix/Tensor Computations □ Low-Rank Models  □ chenxy346@gmail.com N♠ https://xinychen.github. □ https://github.com/xinycy □ chenxy346 □ Google Scholar ⑤ 613 citation In Summer 2023, I will finish my IVADO PhD Excellence Scholarsh focuses on machine learning, spanners on | Matrix/Tensor Computations □ Low-Rank Models □ Time Series Analysis □ chenxy346@gmail.com N♠ https://xinychen.github.io (homepage) ○ https://github.com/xinychen ☑ chenxy346 ⑤ Google Scholar ⑧ 613 citations (h-index: 10 & i10-index: 10)  In Summer 2023, I will finish my PhD at University of Montreal (IVADO PhD Excellence Scholarship and the CIRRELT PhD Excellence focuses on machine learning, spatiotemporal data modeling, and in ② PhD in Civil Engineering (Transportation) ⑥ Polytechnique Montreal, University of Montreal ② IVADO PhD Excellence Scholarship & CIRRELT PhD Excellence Scholarship & CIRRELT PhD Excellence Scholarship & CIRRELT PhD Excellence Scholarship & Constant professor at Polytechnique Moc ○ Co-advisor: Lijun Sun (assistant professor at McGill University ② Outstanding Thesis Award (top 2% in total) ○ Thesis: Imputing Spatiotemporal Missing Traffic Data by Bayesian ○ Advisor: Zhaocheng He (full professor)  ③ Bachelor's degree in Traffic Engineering ⑥ Guangzhou University ○ Thesis: Modeling Vehicles' Time Headway with Log-Normal and Io ○ Advisor: Xiaodong Zang (full professor)  ② CIRRELT PhD Excellence Scholarship (\$5,000) ② IVADO PhD Excellence Scholarship (\$5,000) ② IVADO PhD Excellence Scholarship (\$100,000, by Institute for Data Quitstanding Thesis Award (by Sun Yat-Sen University) ② National Scholarship (by Ministry of Education of China)  Google Scholar: https://scholar.google.com/citations?users/ ○ First-author papers  7. Xinyu Chen, Lijun Sun (2022). Bayesian temporal factorization for prediction. IEEE Transactions on Pattern Analysis and Machine Inte |  |  |

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
```

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, grap<br>tensor structures, and technical frameworks in LaTeX. (Most<br>from our research papers.)  |                    | .06 - present |  |  |
|--|--|--------------------|---------------|--|--|
|  | 🕠 xinychen/awesome-latex-drawing 🏻 🏠 950+ stars  |                    |               |  |  |
|  | <b>☑ LaTeX-cookbook</b> : Academic writing with LaTeX: A tutorial (  | (in Chinese). 2021 | .05 - present |  |  |
|  | xinychen/latex-cookbook 🌣 600+ stars   |                    |               |  |  |
|  | ■ awesome-beamer: Creating presentation slides by using Beam<br>(Most examples are from our research.)   | mer in LaTeX. 2020 | .11 - present |  |  |
|  | xinychen/awesome-beamer  \$\frac{\frac{1}{12}}{12}} 60+ stars  |                    |               |  |  |
|  |  | ensional and 2020  | .11 - present |  |  |
|  | 🕥 xinychen/tracebase 🏠 30+ stars   |                    |               |  |  |
| Presenta-<br>tion<br>& Talk  | TION • IVADO Project Workshop  |                    |               |  |  |
|  | <ul> <li>Nonstationary temporal matrix factorization for multivariate time series forecasting. 2022.0</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 s</li> <li>IFT 6760A Course (<i>Matrix and tensor factorization techniques f</i></li> <li>Slides: https://doi.org/10.5281/zenodo.4693404</li> </ul>             | •                  | 2021.03       |  |  |
| BLOG Posts I enjoy writing some blog posts about my research (30+ posts & 60,000+ views & 280+ followers on Medium).   Medium https://medium.com/@xinyu.chen  Selected posts |  |                    |               |  |  |
|  | <b>5</b> . Temporal matrix factorization for multivariate time series forecasting.   | 4,000+ views       | 2022.03.20    |  |  |
|  | <ol><li>Reduced-rank vector autoregressive model for<br/>high-dimensional time series forecasting.</li></ol>   | 4,000+ views       | 2021.10.16    |  |  |
|  | <b>3</b> . Dynamic mode decomposition for multivariate time series forecasting.  | 13,000+ views      | 2021.10.10    |  |  |
|  | <ol><li>Matrix autoregressive model for multidimensional time<br/>series forecasting.</li></ol>  | 8,000+ views       | 2021.10.03    |  |  |
|  | <ol> <li>Intuitive understanding of randomized singular value<br/>decomposition.</li> </ol>  | 8,000+ views       | 2020.07.01    |  |  |
| Skills   | ☐ Language: Chinese (native) & English (fluent)  |                    |               |  |  |
| ☐ <b>Expertise</b> : Python/Matlab/Julia/R/Java; NumPy/PyTorch/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)
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## **Prof. Lijun Sun** (co-advisor)

- Assistant Professor
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- McGill University
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## **Prof. Xi-Le Zhao** (collaborator)

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