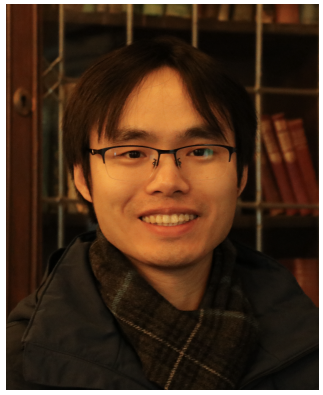


Xinyu Chen

Postdoc, MIT (now)

PhD, University of Montreal ('23)

Civil Engineering (Transportation)

Interests

- Advanced computing for engineering
- Urban system & mobility & demand
- Data-driven traffic flow modeling
- Climate system monitoring
- Machine learning & data science
- Optimization & math programming

Interdisciplinary Research

Computational Engineering in CEE

PhD (ML for Transportation)

- **Traffic imputation** w/ tensor decomposition
  Chen et al.'19; Chen et al.'21 in TR-C (cited 300+)
  Chen et al.'22 in IEEE TITS (cited 100+)
- **Time series imputation** w/ Laplacian convolution
  Chen et al.'24 in IEEE TKDE
- **Mobility prediction** w/ Bayesian optimization
  Chen & Sun'22 in IEEE TPAMI (cited 250+)
- **Traffic prediction** w/ Hankel factorization
  Chen et al.'24 in IJOC
- **Dynamic climate pattern discovery**
  Chen et al.'24 in IEEE TKDE

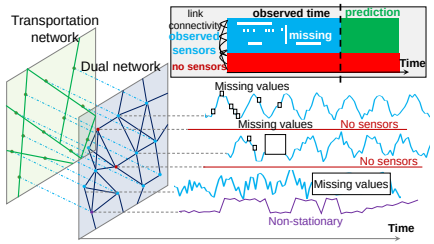
Postdoc (ML + Optimization for Spatiotemporal Data)

- **Tensor decomposition for ML**
  Chen et al.'24, major revision in IEEE TPAMI
- **Causal inference from climate systems**
  Chen et al.'24, 2nd-round review in IEEE TKDE
- **Mobility periodicity quantification w/ MIP**

Research Contributions

- Formulating engineering problems

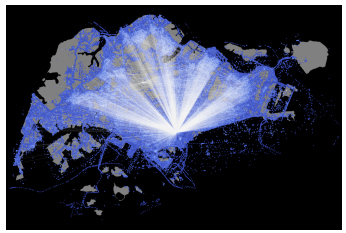
Traffic Imputation



Missing data in transport

Matrix/tensor decomposition
Temporal dynamics

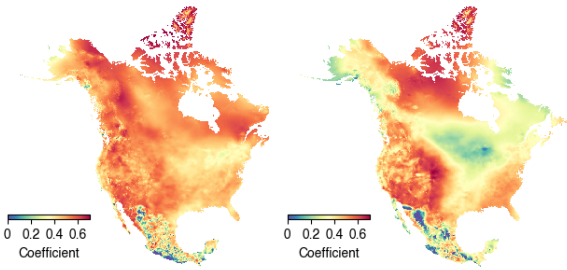
Mobility Pattern Discovery



Singapore movement

Dynamical system modeling
Tensor decomposition

Climate Seasonality Qualification

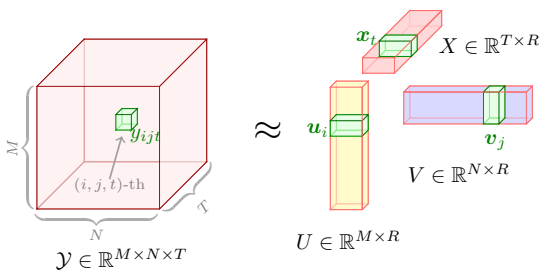


2000s 2010s

Interpretable ML
Mixed-integer programming

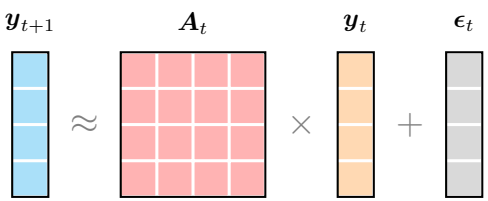
- Advancing ML development

Tensor decomposition



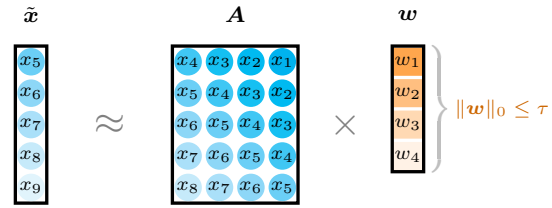
Integrate traffic flow patterns

Dynamic mode decomposition



Formulate dynamic patterns

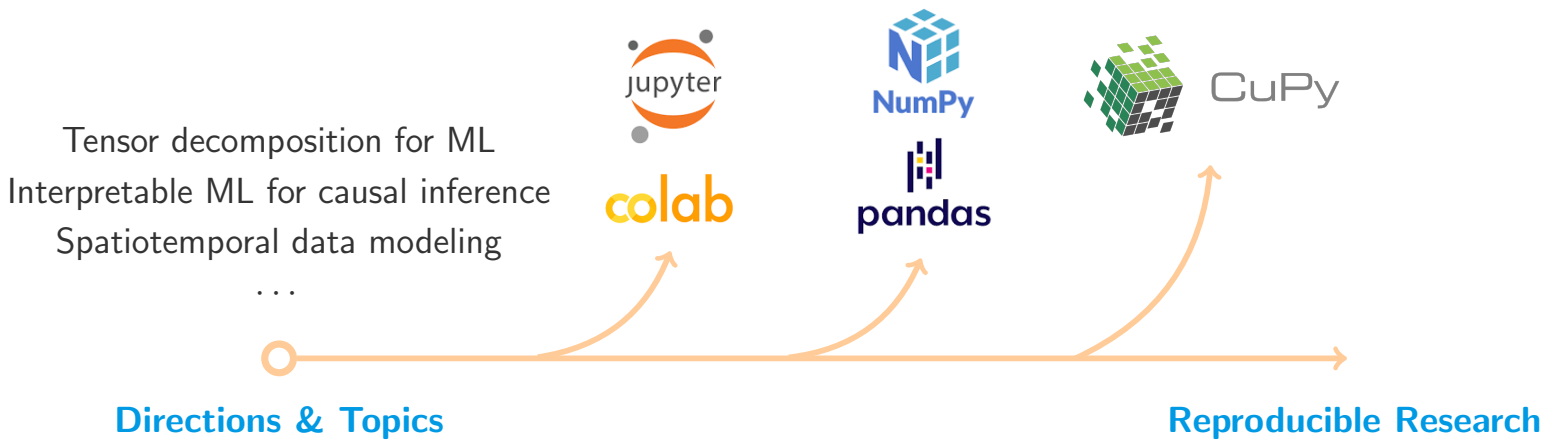
Sparse autoregression



Find sparse autocorrelations

Reproducible Research for Engineering

- The last mile of AI for computational engineering



Building Research Impact at Vanderbilt

CEE Collaboration
Synergistic with Vanderbilt's College of Connected Computing

Teaching & Grant