2025 AMS Bootcamp
Latex Workshop

Ziyu Li[1]

[1]Department of Applied Mathematics and Statistics,
Colorado School of Mines

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Outline

What is it?

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Typesetting software originally written in the 1980s.

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Why people love it:

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- Minimum and flexible citation management.
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Why people hesitate to use it:

- Steep learning curve when getting started, good templates?
- Overleaf renders too slowly and sometimes full of bugs.
- Different bibliography options and compliers are confusing.
- Working with scientists that prefer Word or Google Doc.

Editor Software Options

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- Great for thesis, projects, books, etc.

Agenda

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1. **Setup**
   Go to GitHub link: `github.com/ziyuli22/2025_AMS_Latex_Workshop` and download folder. Log into Overleaf account, upload folder.
2. **Common homework commands & expectations**
3. **Poster example**
4. **Presentation example**

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Template Example

Click on `Homework_Example.tex`

Outline

Poster Example

Click on `Poster_Example.tex`

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Presentations Templates

Take a look at
`https://deic.uab.cat/~iblanes/beamer_gallery/`
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This presentation is a modification on the Madrid theme.

Add Algorithms & Use Pause

Data: $\mathbf{y}$ at n spatial locations $\mathcal{S}^O = \{\mathbf{s}_1^O, \mathbf{s}_2^O, \ldots, \mathbf{s}_n^O\}$.
Goal: Quantify uncertainty of predictions $\hat{g}$ on evenly spaced grid $\mathcal{S}^G = \{\mathbf{s}_1^G, \mathbf{s}_2^G, \ldots, \mathbf{s}_M^G\}$.

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Algorithm 1 Conditional Simulation Method

Input: Spatial data $\mathbf{y}$, their locations $\mathcal{S}^O$, and prediction grid locations $\mathcal{S}^G$.
Output: Ensemble of l conditional simulations $\mathbf{v} = \{\mathbf{v}_1, \ldots, \mathbf{v}_l\}$. $\mathbf{v}_j \sim MVN(\hat{g}\left(\mathcal{S}^G\right), \Sigma_{\hat{g}})$.

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For $j = 1 : l$

- Simulate spatial process at the union of locations $\mathcal{S}^S = \mathcal{S}^G \cup \mathcal{S}^O$, label this $g^S(\mathcal{S}^S)$.

End

Others

- Everything else is similar to poster. Be mindful how large your picture files are because that can slow down rendering.
- Make sure to cite things too [1].

References

[1] Aurthor01 CoolLastName, Author02 AnotherLastName, and Aurthor03 ALastName. “Place Holder Title for a Fake Journal”. In: *Place Holder Journal* 11 (1 Dec. 2022). ISSN: 2000000. DOI: 000000000.

Extra Slides for Questions or other Technical Details

Simulation via Cholesky Decompositon
Cholesky decomposition: $\Sigma = BB^{\mathrm{T}}$
Obtain simulation: $g(\mathbf{s}) = B\boldsymbol{\epsilon}$, $\boldsymbol{\epsilon} \sim \mathrm{MVN}(0, I)$

$$\mathbb{E}[B\boldsymbol{\epsilon}] = B\mathbb{E}[\boldsymbol{\epsilon}] = 0$$
$$\mathrm{Var}(B\boldsymbol{\epsilon}) = B\mathrm{Var}(\boldsymbol{\epsilon})B^{\mathrm{T}} = BIB^{\mathrm{T}} = \Sigma$$

Sometimes you include more slides than you actually present to be prepare to demonstrate difficult concepts.