t'!

tractable probabilistic inference meeting !

Let's discuss about the current state of *flexible*, *reliable*, and *efficient* probabilistic inference and learning...
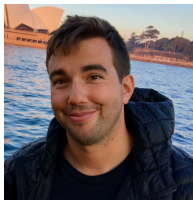
and where we want it to be!

relationalAI

Uber

Schedule

- **7:15 - 7:30** Opening
- **7:30 - 8:00** Spotlight talks: *Eric*, *Eli*
- **8:00 - 8:30** Open discussions
- **8:30 - 9:15** Spotlight talks: *Hong*, *Molham*, *Pasha*
- **9:15 - 10:00** Open discussions
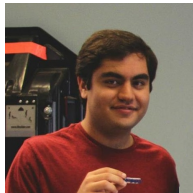- **10:00** Closing remarks
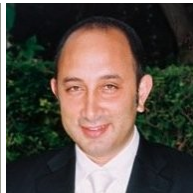
Spotlights

Eric Nalisnick **Eli Bingham** **Hong Ge** **Pasha Khosravi** **Molham Aref**

Let's keep in touch!

feel free to join the t' newsletter

Why probabilistic inference?

Why probabilistic inference?
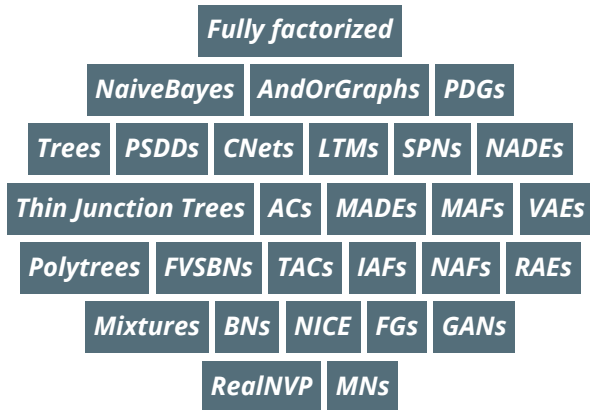
*To enable and support
decision making in the **real world**.*

Why probabilistic inference?

To enable and support robust decision making on noisy, heterogeneous, complex data.

*Why **efficient**, **reliable** and **flexible** **probabilistic** inference?*

*To enable and support **robust** decision making on **noisy**, **heterogeneous**, **complex** data.*

Fully factorized
NaiveBayes **AndOrGraphs** **PDGs**
Trees **PSDDs** **CNets** **LTMs** **SPNs** **NADEs**
Thin Junction Trees **ACs** **MADEs** **MAFs** **VAEs**
Polytrees **FVSBNs** **TACs** **IAFs** **NAFs** **RAEs**
Mixtures **BNs** **NICE** **FGs** **GANs**
RealNVP **MNs**

The Alphabet Soup of probabilistic models

Fully factorized

NaiveBayes · **AndOrGraphs** · **PDGs**

Trees · **PSDDs** · **CNets** · **LTMs** · **SPNs** · **NADEs**

Thin Junction Trees · **ACs** · **MADEs** · **MAFs** · **VAEs**

Polytrees · **FVSBNs** · **TACs** · **IAFs** · **NAFs** · **RAEs**

Mixtures · **BNs** · **NICE** · **FGs** · **GANs**

RealNVP · **MNs**
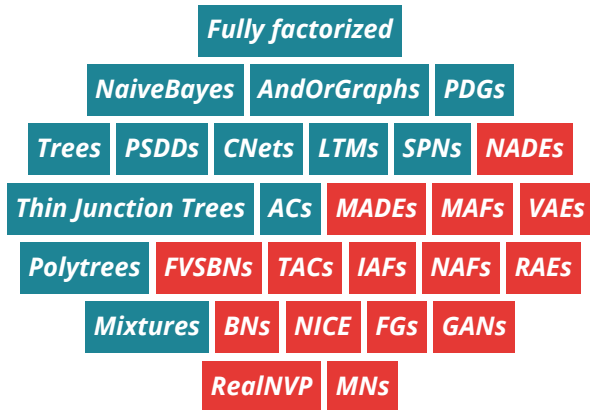
Intractable and *tractable* models

Fully factorized

NaiveBayes **AndOrGraphs** **PDGs**

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RealNVP **MNs**
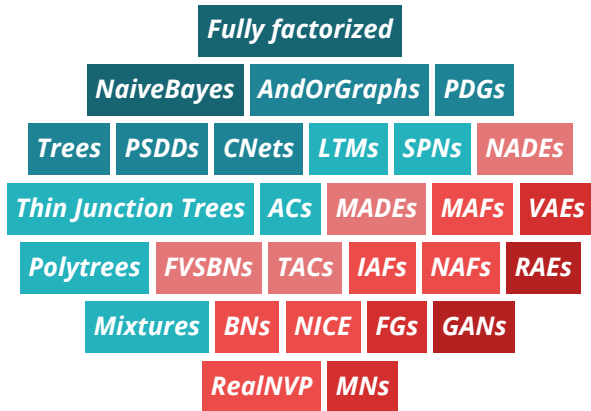
tractability is a spectrum

Fully factorized
NaiveBayes **AndOrGraphs** **PDGs**
Trees **PSDDs** **CNets** **LTMs** **SPNs** **NADEs**
Thin Junction Trees **ACs** **MADEs** **MAFs** **VAEs**
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Mixtures **BNs** **NICE** **FGs** **GANs**
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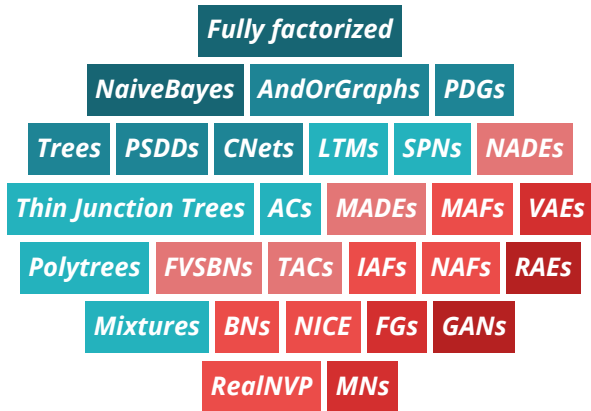
What about flexibility and expressiveness?

Can your GAN provide you calibrated uncertainties?

Can your VAE inpaint any pixel patch?

Can your Flow flawlessly deal with missing values?

Fully factorized

NaiveBayes | **AndOrGraphs** | **PDGs**

Trees | **PSDDs** | **CNets** | **LTMs** | **SPNs** | **NADEs**

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RealNVP | **MNs**
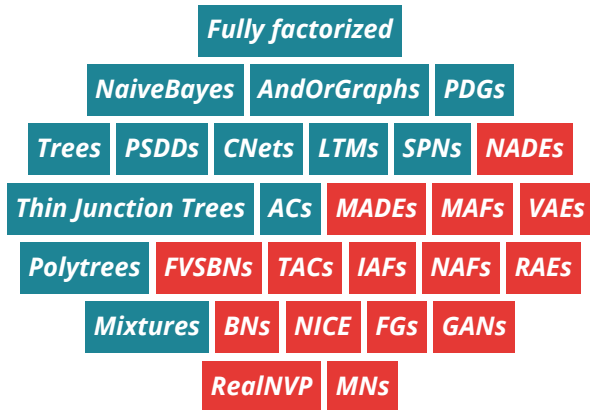
Do tractable models solve everything?
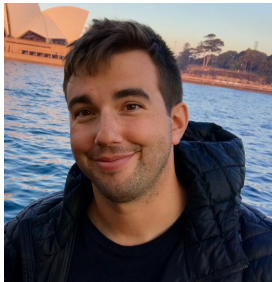
Can you generate hi-res images with your SPN?

t'!

Can you scale learning a PSDD on Imagenet?

Can your circuit deal with non-axis aligned constraints?

t'!

Eric Nalisnick

University of Cambridge & Deepmind

Normalizing Flows for Tractable Probabilistic Modeling and Inference
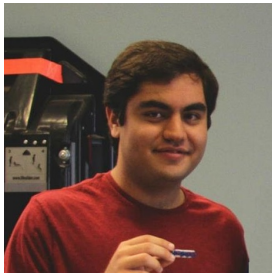
`enalisnick.github.io`

Eli Bingham
Uber AI Labs

Practical Parallel Variable Elimination Algorithms

`pyro.io`

Spotlights

Pasha Khosravi

University of California, Los Angeles

Juice.jl: a Julia library
for advanced probabilistic
inference

`web.cs.ucla.edu/~pashak/`

Spotlights

Hong Ge
University of Cambridge
Turing: a robust, efficient and modular library for flexible probabilistic inference

`mlg.eng.cam.ac.uk/hong/`

Let's keep in touch!

feel free to join the t' newsletter

And let's meet at the second t'!

news soon