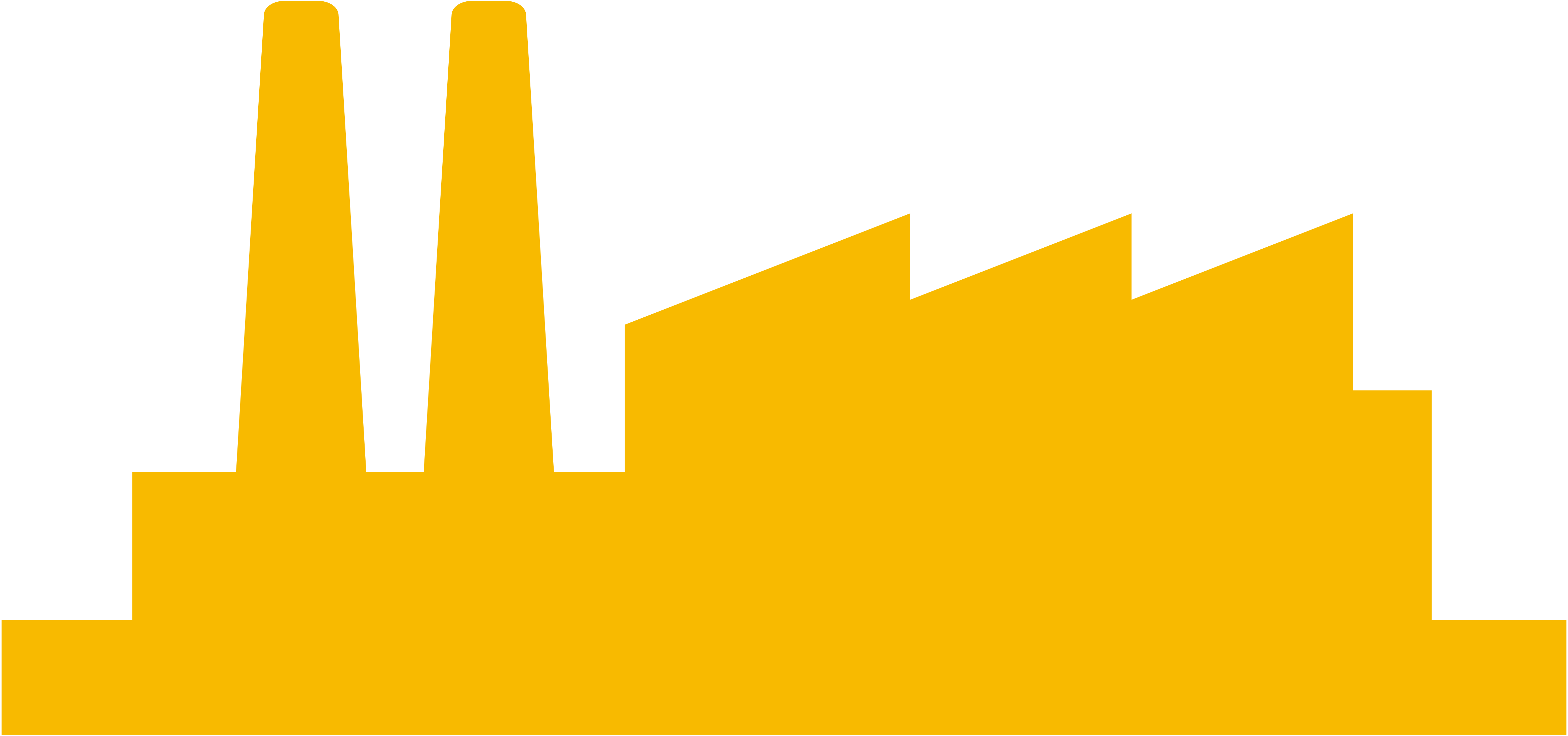




**Solved cases**



The background is a solid blue color. On the left side, there is a stylized white graphic consisting of two tall, narrow vertical bars and a series of three connected, sloping rectangular blocks of varying heights. The text is white and positioned on the right side of the image, overlaid on the blue background.

# discrete Markov chains

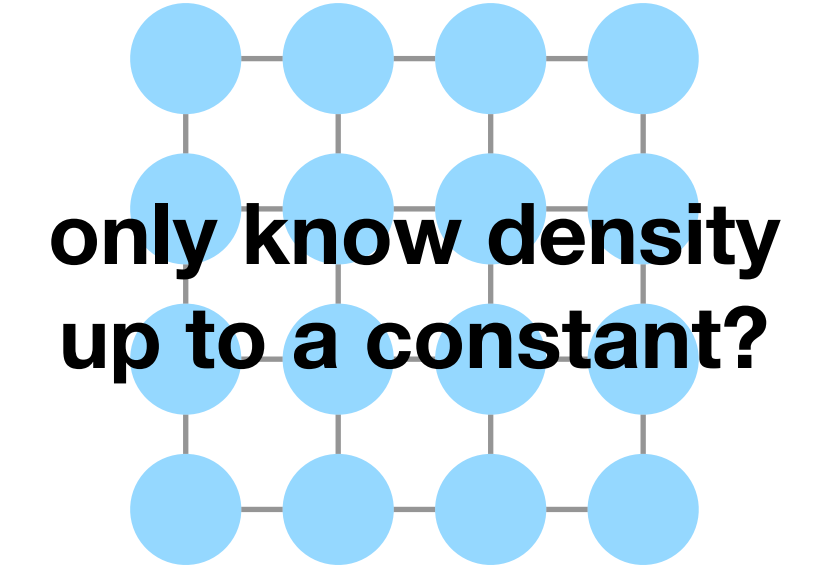
(Sesia, Sabatti and Candès, 2018)

The background is a solid blue color. On the left side, there are two tall, thin, white rectangular shapes that resemble stylized buildings or towers. To the right of these, there is a series of white, jagged, sawtooth-like shapes that also resemble a stylized skyline or a mountain range. The text is white and positioned in the center-right area of the image.

# multivariate Gaussian

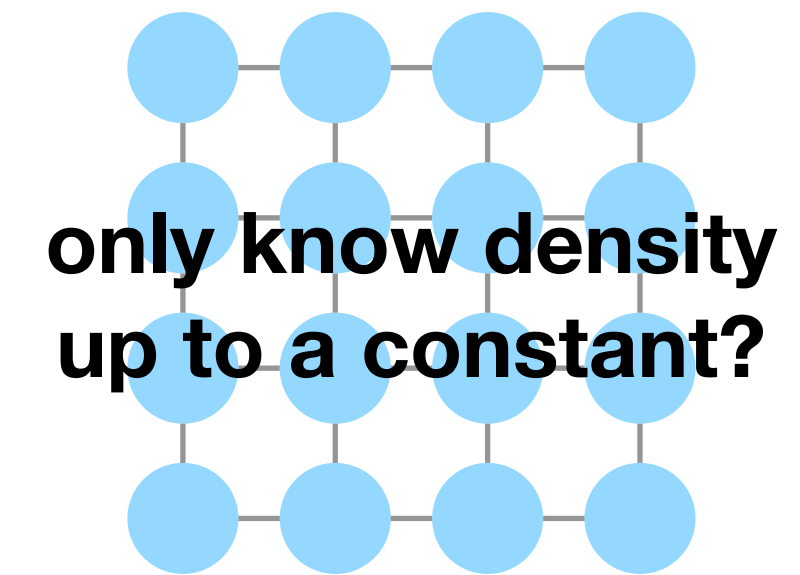
(Candès, Fan, Janson and Lv, 2018)

**OldKnockoffFactory**

A diagram consisting of a 4x4 grid of light blue circles. Each circle is connected to its four immediate neighbors (up, down, left, right) by a thin gray line, forming a square lattice. Overlaid on the center of this grid is the text "only know density up to a constant?" in a bold, black, sans-serif font.

**only know density  
up to a constant?**

# Solved cases



**Old Knockoff Factory**

**multivariate  
Gaussian**

(Candès, Fan, Janson and Lv, 2018)

**discrete  
Markov chains**

(Sesia, Sabatti and Candès, 2018)



## 1. Introduction

- Variable selection and model-X knockoffs
- Knockoff sampling is difficult

## 2. **Characterizing knockoff distributions**

- The characterization theorem
- Connection to Markov chain Monte Carlo (MCMC)

## 3. Metropolized knockoff sampling (Metro)

- How it works
- Time complexity and graphical structure

## 4. Good proposals inspired by the MCMC literature

- Covariance-guided proposal
- Multiple-try Metropolis (MTM)

## 5. Simulation results

## 6. Discussion