CS224W: Machine Learning with Graphs

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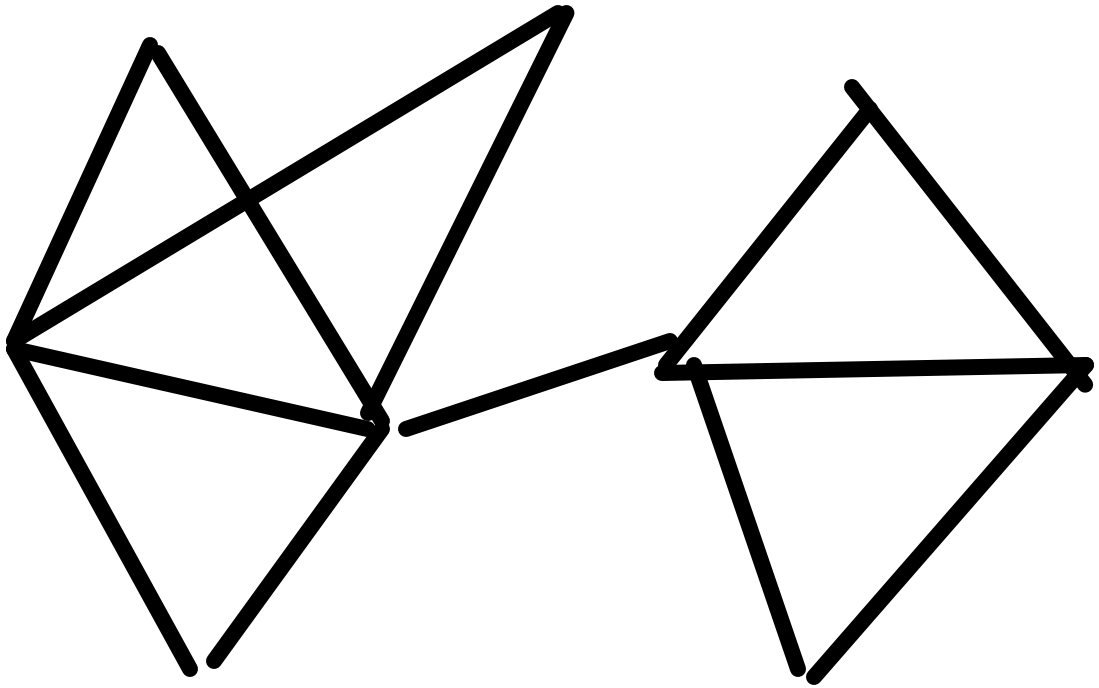
http://cs224w.stanford.edu

- The class meets Tue and Thu 1:30-3:00pm Pacific Time *in person*

- OHs will be virtual
  - We will have OHs every day, starting from 2nd

- Single exam: Friday, Nov 19
  - Take-home, open-

- The course is self-



Graph

Image credit: Maximilian Nickel et al

Knowledge Graphs

Image credit: [illegible]

3D Shapes

Networks are complex.

- Arbitrary size and complex topological structure (

Map nodes to d-dimensional embeddings such that similar nodes in the network are embedded close together

Jeskovec

- **Node classification**: Predict a property of a node
  - Example: Categorize online users / items
- **Link prediction**: Predict whether there are missing

A protein chain acquires its native 3D structure

Á Key idea: á{LJI·ŭλI·f ∃ℕJI·LJKé

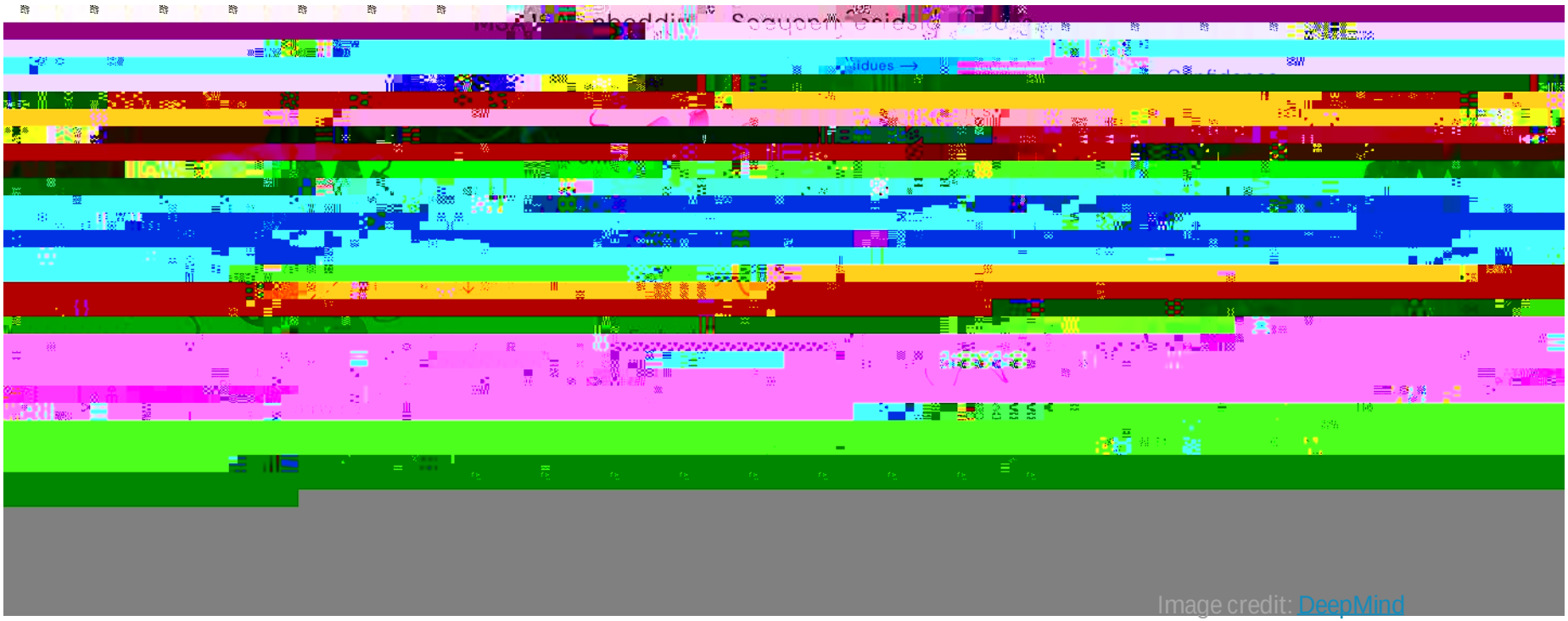
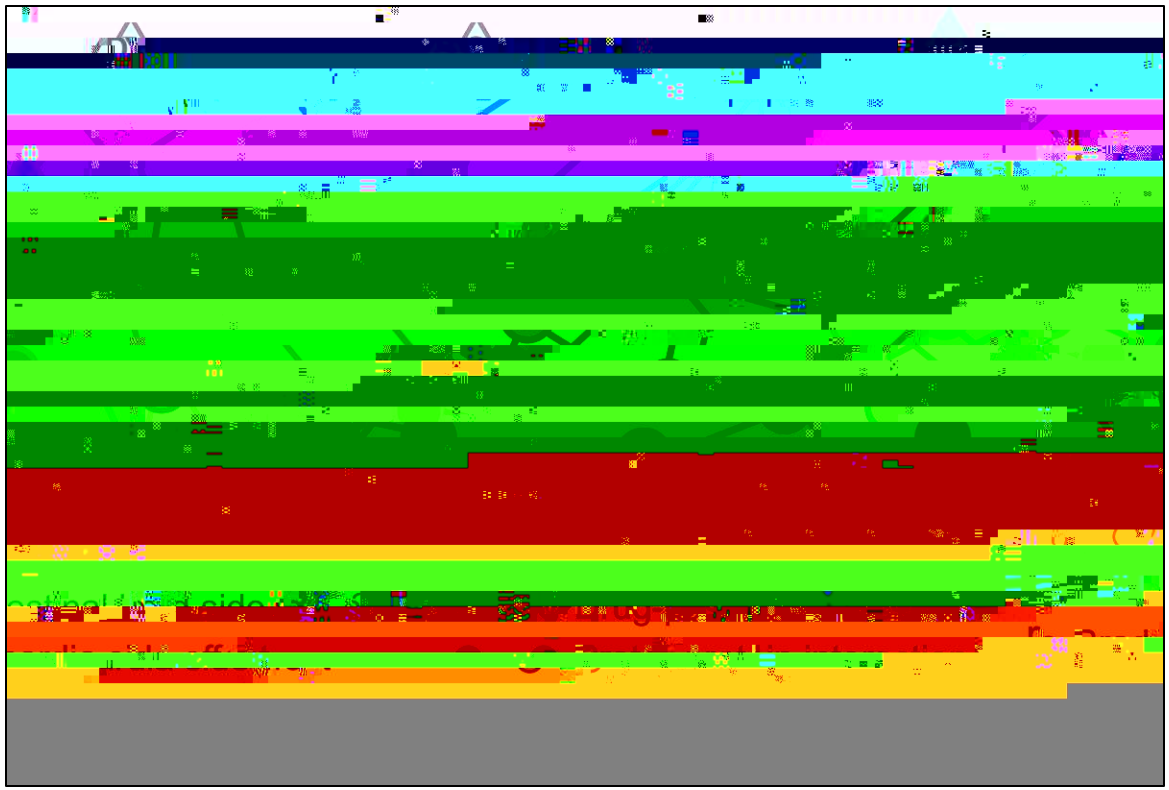


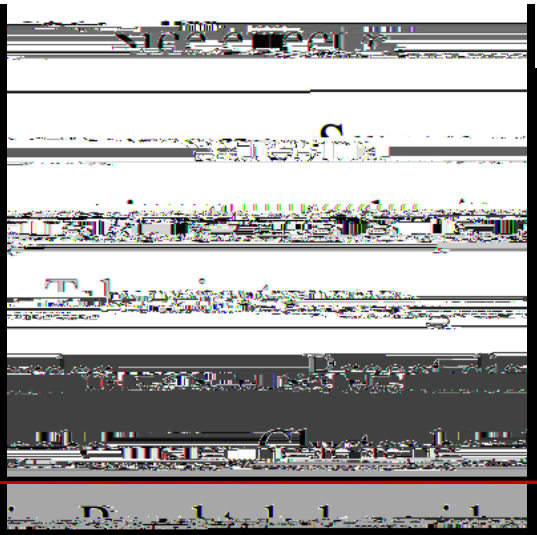
Image credit: DeepMind

- Nodes: Drugs & Proteins
- Edges: Interactions



Drug *c*

Drug *d*



Evidence fo

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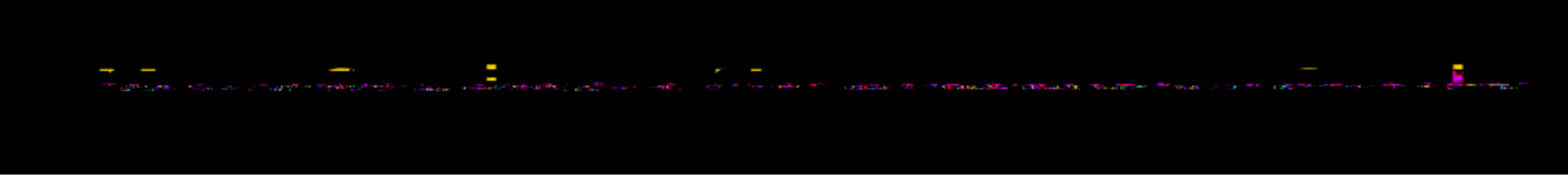
- Objects: nodes, vertices N

- If you connect individuals that work

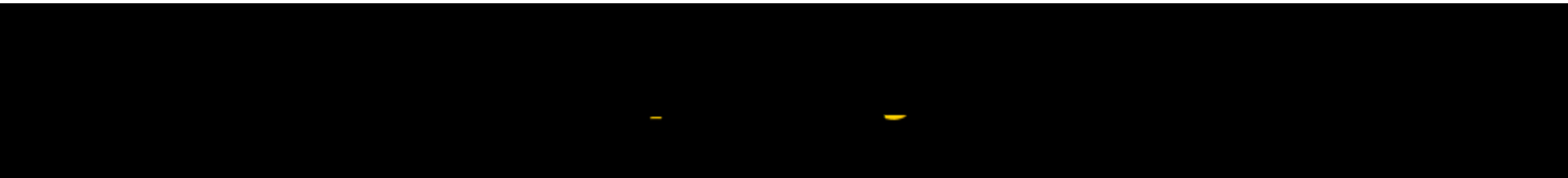
- How to build a graph:
  - What are nodes?
  - What are edges?
- Choice of the proper network representation of a given domain/problem determines our ability to use networks successfully:



Biomedical Knowledge Graphs

Academic Graphs

Undirected



Largest Component:

The adjacency matrix of a network