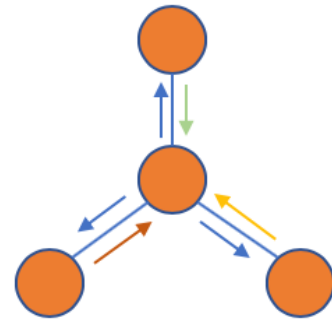




## Topics in Graph Neural Networks

Lately, applying deep learning to graph-based problems has gained a lot of interest. Graph neural networks, in particular, achieved great success in knowledge graphs, reinforcement learning, chemistry, or physics simulations. These models are mostly based on the message passing framework, where nodes exchange messages over the edges and update their states based on all of the aggregated incoming messages. However, the current models generalize poorly to larger graphs, have trouble relaying long-range information over the graph, are susceptible to adversarial attacks and like for the most deep learning models, their decision process is opaque.



We offer many topics on deep learning for graphs. Do not hesitate to contact us if you want to

- Investigate GNN limitations
- Apply GNNs to combinatorial graph problems
- Develop better attacks on GNNs or improve their robustness
- Develop neural physics simulators
- Make explainable models
- Investigate hierarchical data representations
- ...

You are also more than welcome to come up with your own ideas.

**Requirements:** Strong motivation, knowledge in deep learning, or a solid background in machine learning. Experience with Python and TensorFlow or PyTorch is an advantage as well as knowledge in graph theory, distributed computing and graph neural networks. We will have weekly meetings to address questions, discuss progress and think about future ideas.

**Interested? Please contact us for more details!**

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