

# Learning Physics-Consistent Particle Interactions

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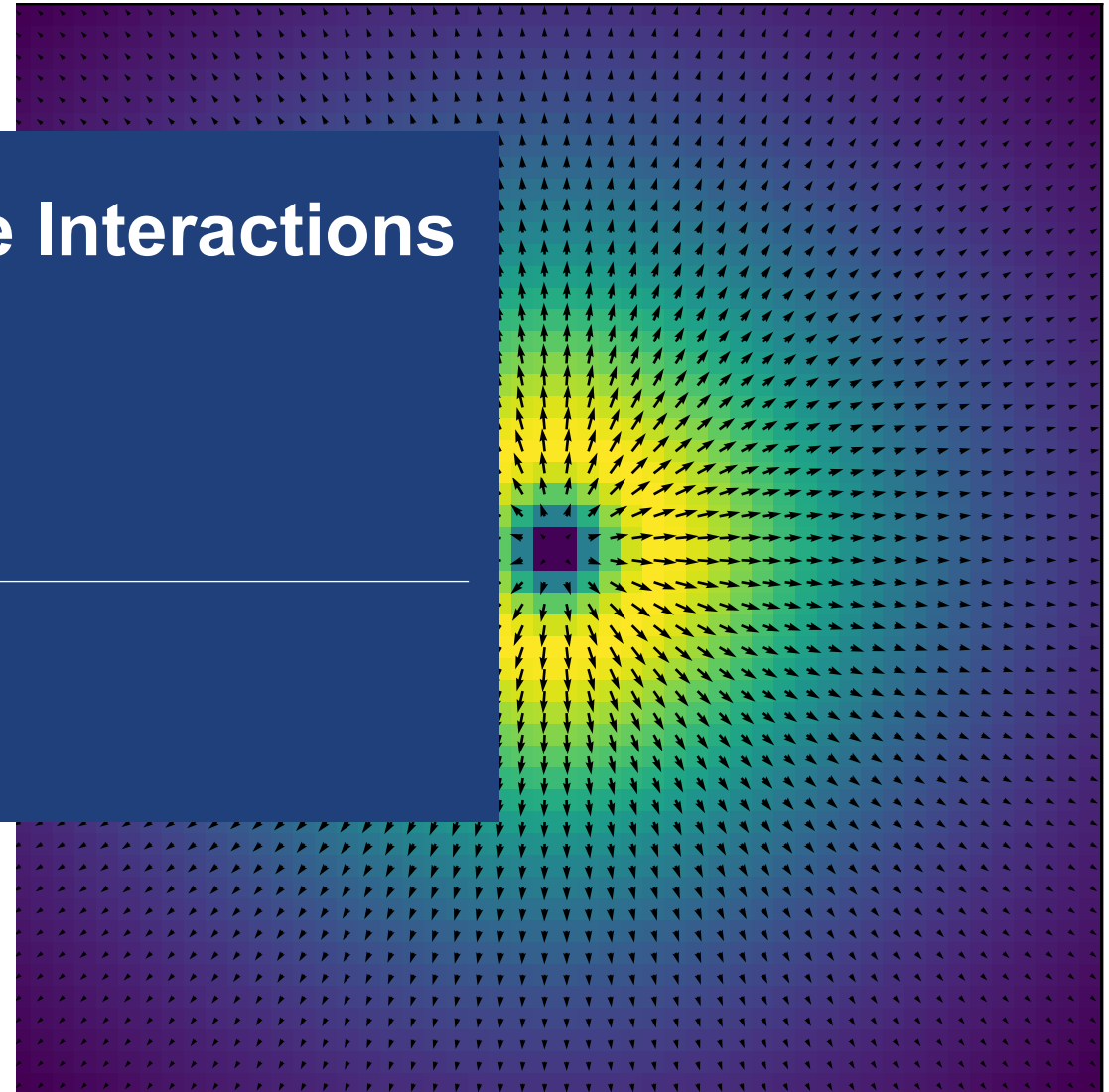
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<sup>2</sup>IMOS, IIC, EPFL

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AMLD EPFL 2022

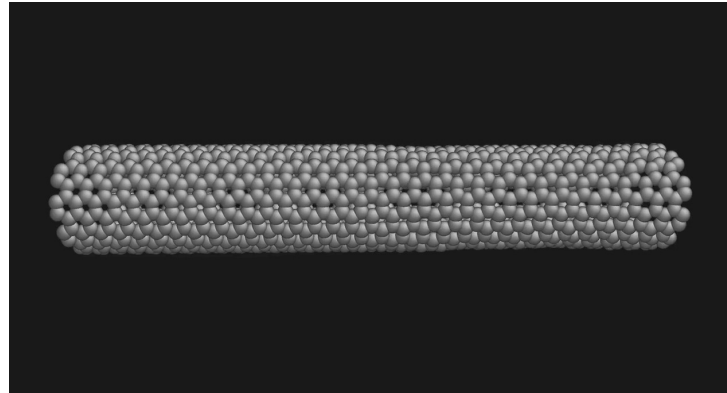
March 28



# Introduction

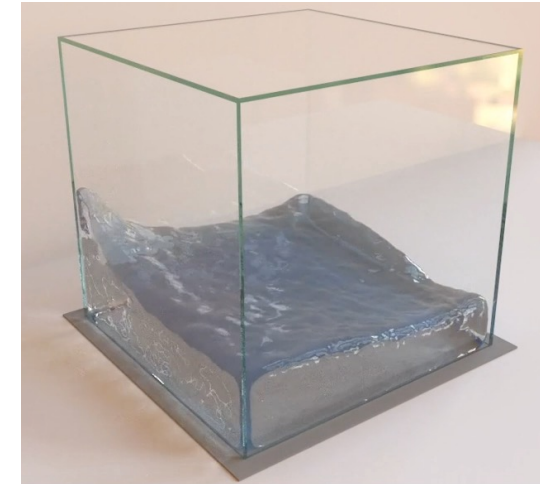


Common building materials



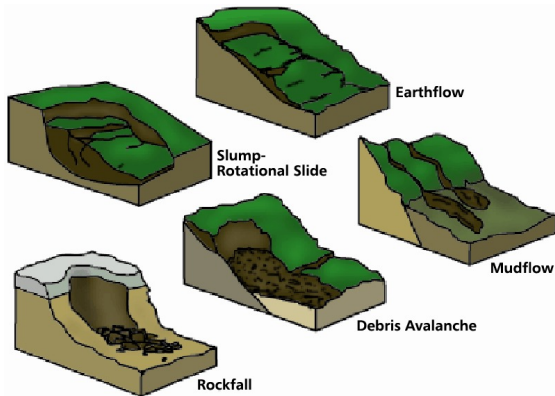
Fracture in material

<https://www.youtube.com/watch?v=qLmitxhPuN8>



Water movement simulation

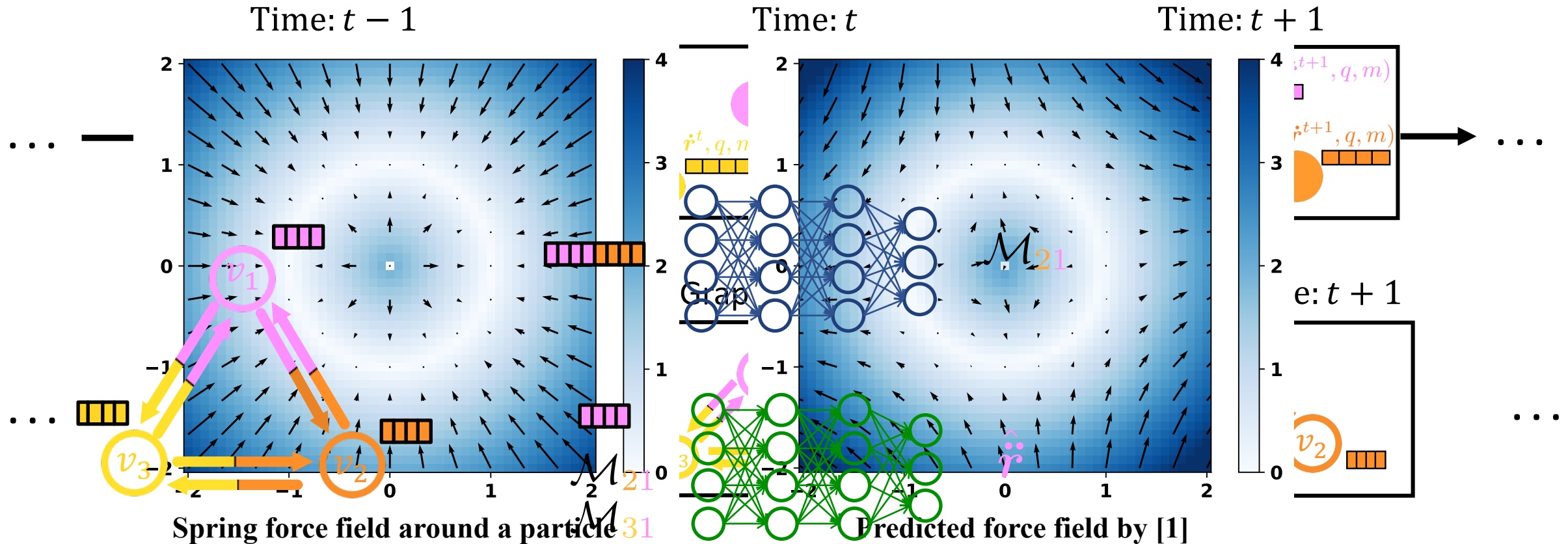
<https://sites.google.com/view/learning-to-simulate>



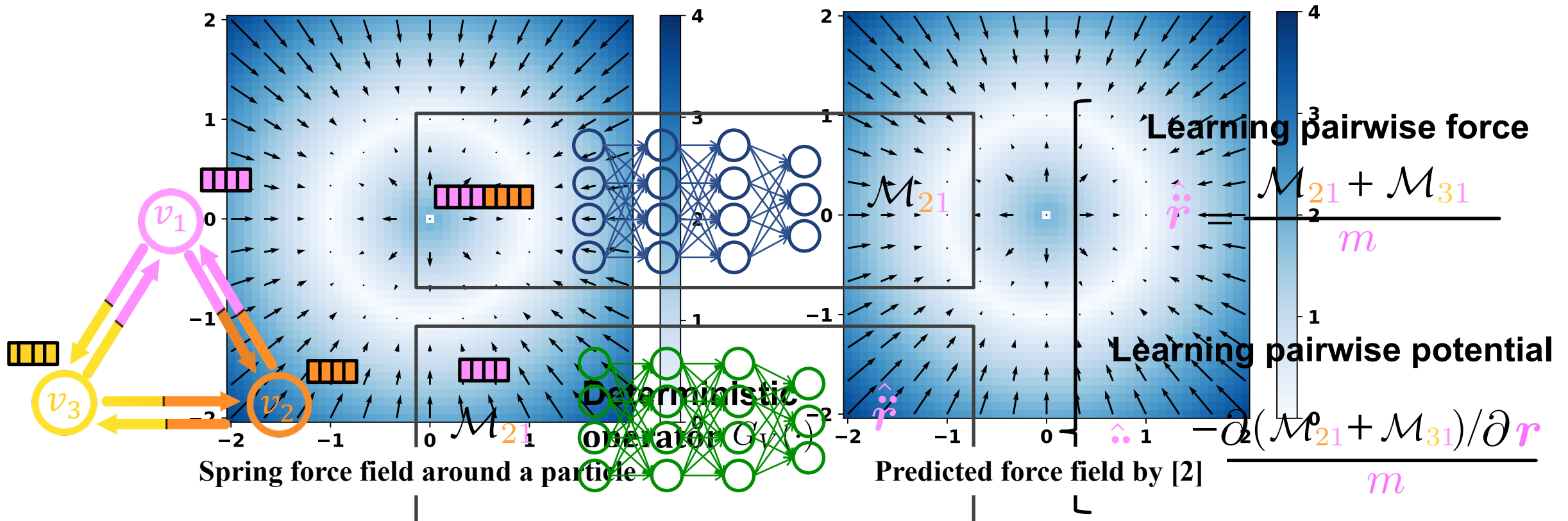
Mass movement process

Images credit:  
<https://www.pinterest.fr/pin/24910604158444228/>  
<https://www.renebay.com/product/red-concrete-brick/>  
<https://compactequip.com/business/agc-proliferating-materials-price-increases-and-supply-chain-disruptions-squeeze-contractors/>  
<https://www.heritage.nf.ca/articles/environment/slope-instability.php>

# Using graph neural networks to learn particle interactions



# PIG'N'PI: Physics-Induced Graph Network for Particle Interaction



- Applicable to different kinds of interactions
- Generalized well on larger systems
- Robust to noisy input (position + velocity)