

**PACE 2020**

Parameterized Algorithms & Computational Experiments Challenge

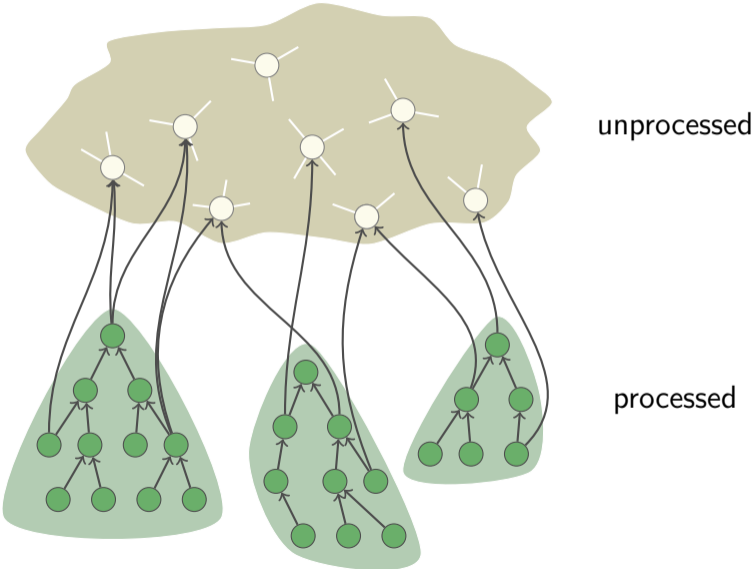
**Sallow**

a heuristic algorithm for treedepth decompositions

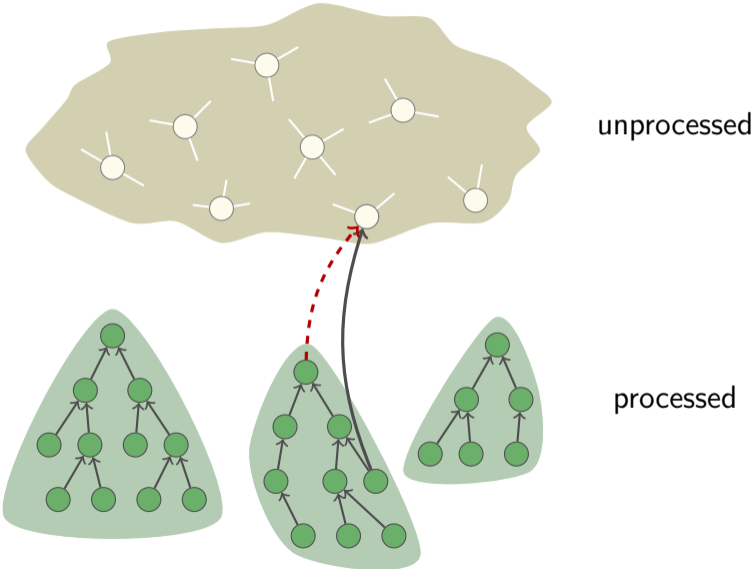
Marcin Wrochna

University of Oxford, UK

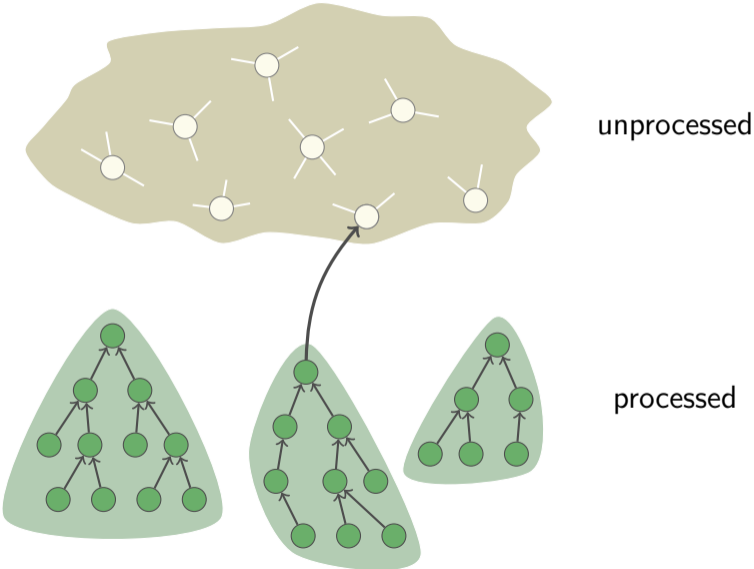
# Greedy elimination



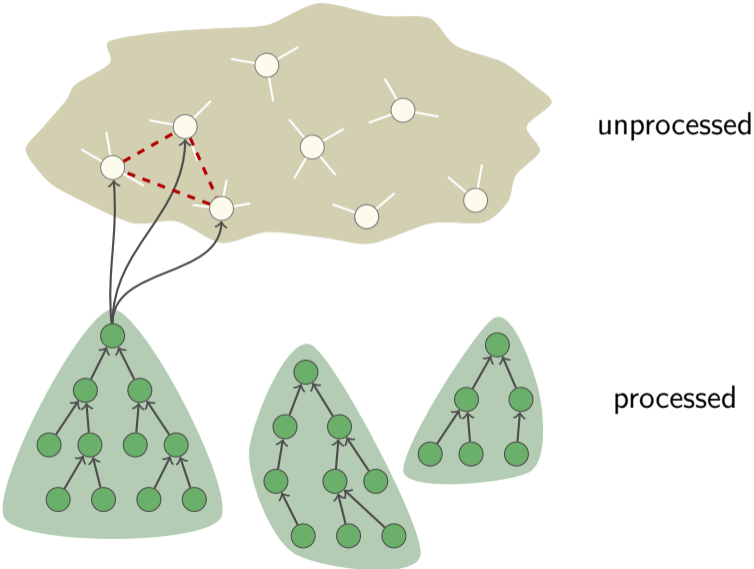
# Greedy elimination



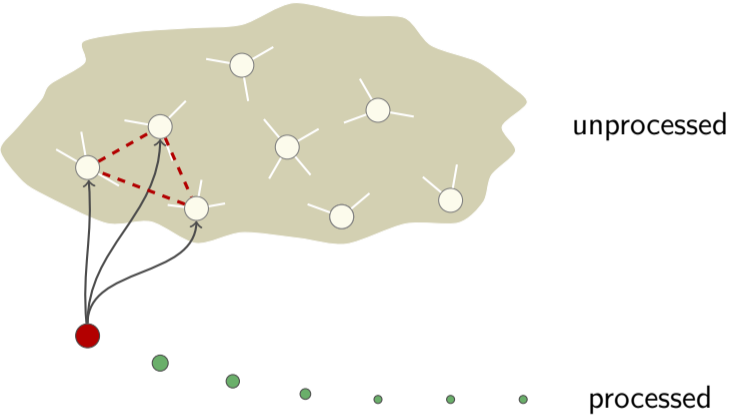
# Greedy elimination



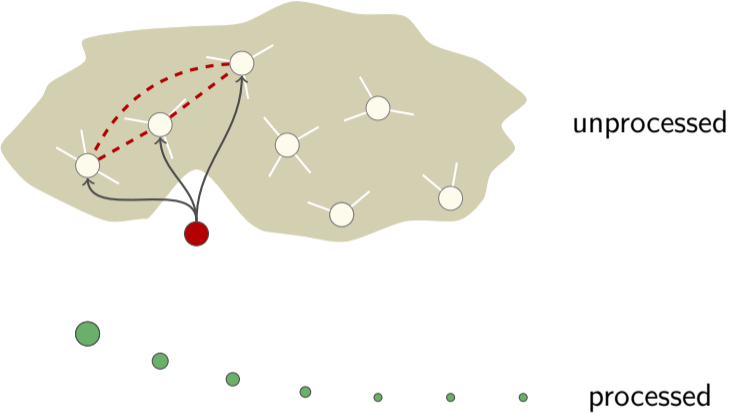
# Greedy elimination



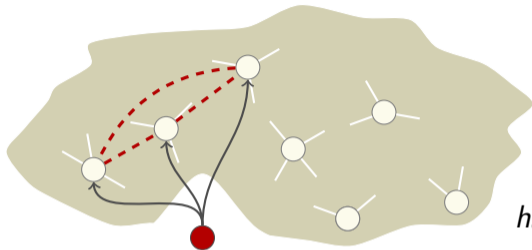
# Greedy elimination



# Greedy elimination



# Greedy elimination



degree  
at elimination

+

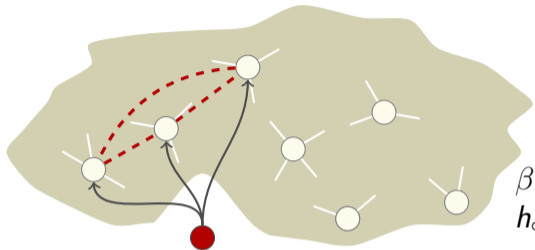
height of tree below  
 $h_o := \max(h_o, 1 + h_{\bullet})$



processed



# Greedy elimination



$\alpha \cdot$  degree  
at elimination

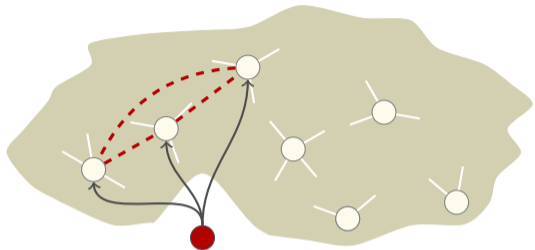
+

$\beta \cdot$  height of tree below  
 $h_o := \max(h_o, 1 + h_{\bullet})$



processed

# Greedy elimination

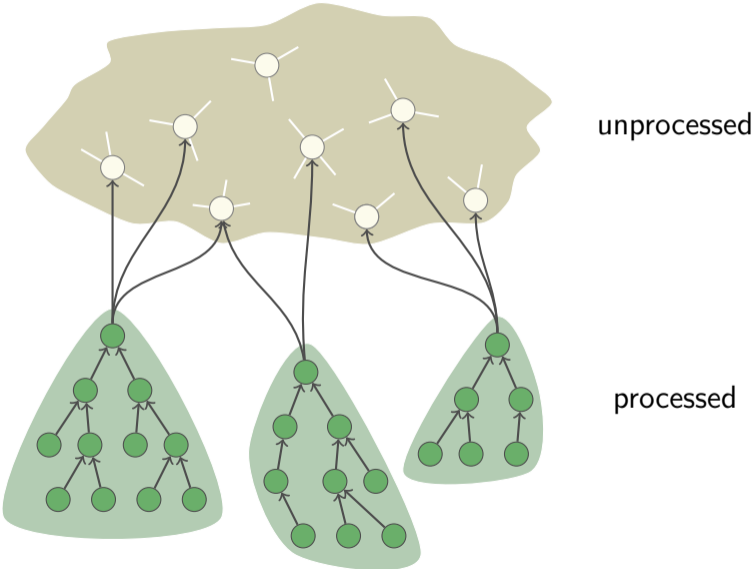


$\sim nd^2$  edges  
:(

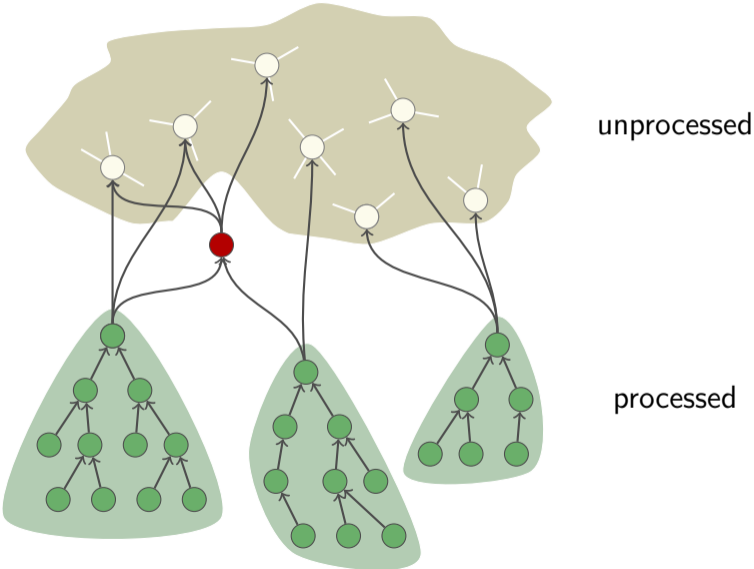


processed

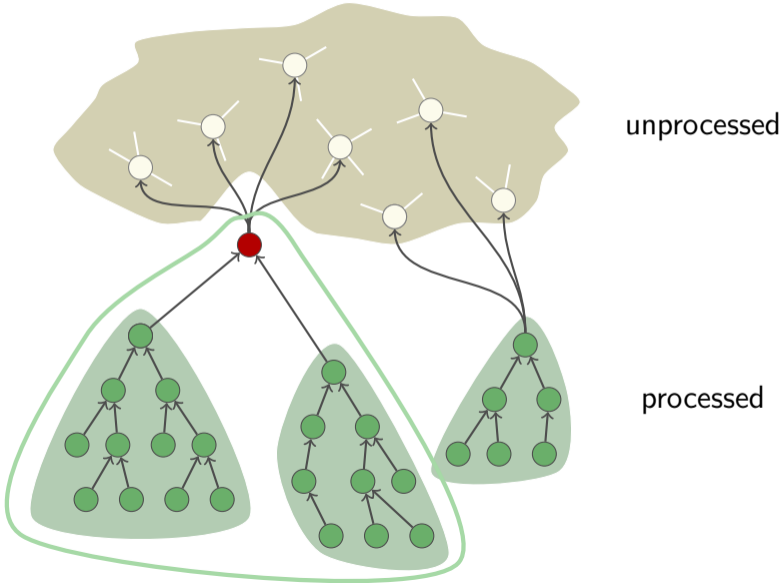
# Greedy building



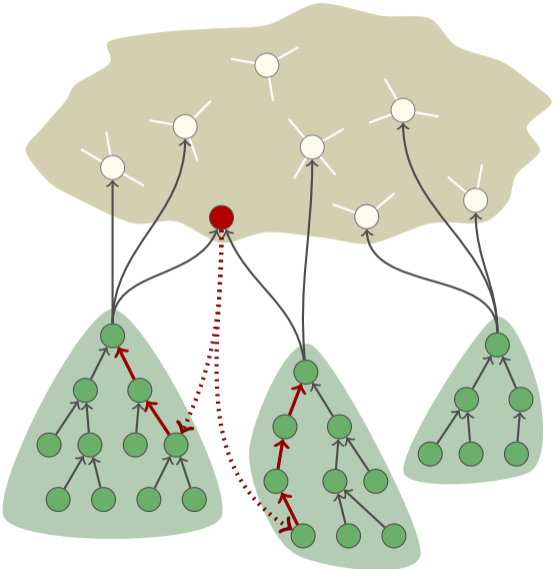
# Greedy building



# Greedy building



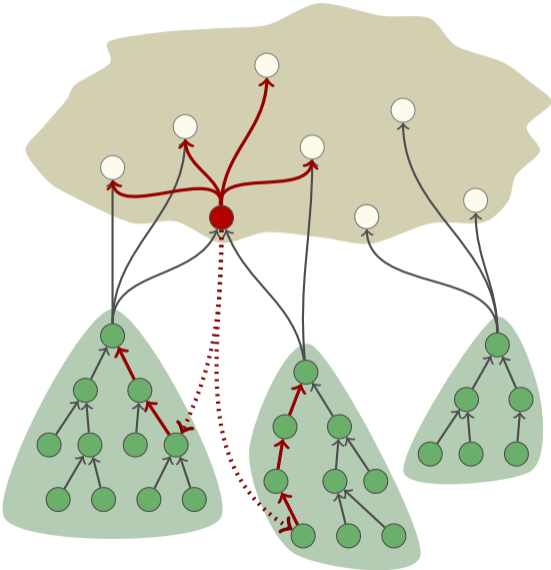
# Greedy building



unprocessed  
(static)

find-union  
structure

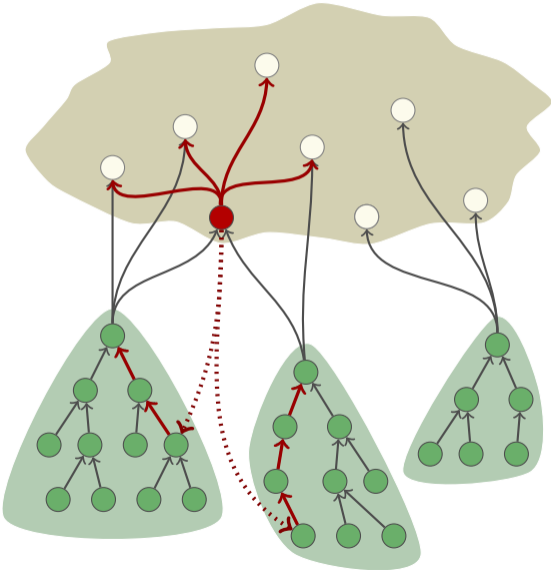
# Greedy building + lookup



update score  
for a few best  
on the heap

find-union  
structure

# Greedy building + lookup

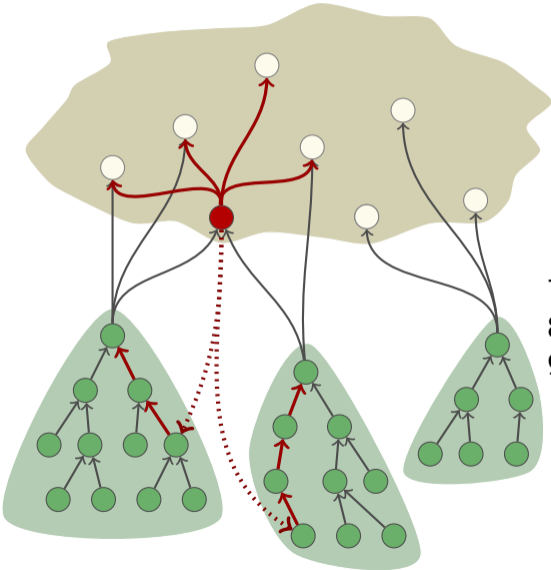


update score  
for top of heap  
1000 times

find-union  
structure



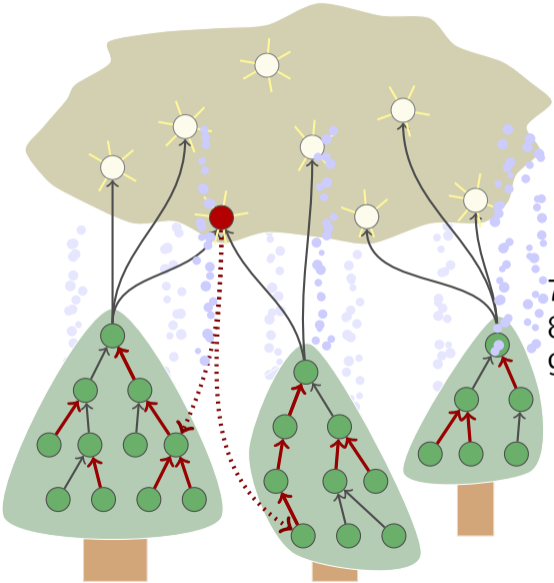
# Greedy building + lookup



update score  
for top of heap  
1000 times

72% in 16 min  
86% in 3000 min  
96% w. FlowCutter

# Greedy building + lookup



update score  
for top of heap  
1000 times

72% in 16 min  
86% in 3000 min  
96% w. FlowCutter

Thanks!