## Simple Data Structures with Slightly Worse Bounds?

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return j

 $\mathcal{O}(n+d+s\cdot (1+\log_{\max(2,s/n)}\min(s,n)))$ 

**Example**: A Simple Integer Successor-Delete Data Structure, Brodal, SEA 25

**Problem**: Internal union-find Init(n) Delete(i) Succ(i) Amortized O(1) time [Gabow, Tarjan JCSS 81] n Delete(random), n Succ(worst) Delete(1, ..., n), n Succ(worst) 1.6 simple simple complicated 1.4 **Proc** Delete(i)  $\Theta(\log n)$ **Proc** Init(n)**Proc** Succ(i)1.2 Create A[1..n] $A[i] \leftarrow i+1$ for  $i \leftarrow 1$  to n do while j < A[j] do path compression successor, 2-pass, microset 1.0 --- union find, microset  $A[i] \leftarrow i$  $j \leftarrow A[j]$ time (sec 1.00 --- quick find, microset 8.0 **Proc** Delete(i) while i < A[i] do complicated if A[i] = i then  $i' \leftarrow A[i]$ 0.6 豆 0.75 0.4 0.50 complicated

Open problem ► Find complicated data structure ► Do something simpler ► Prove its efficiency ► Algorithm engineer it

0.25

0.2

simple