MC-Cons

by

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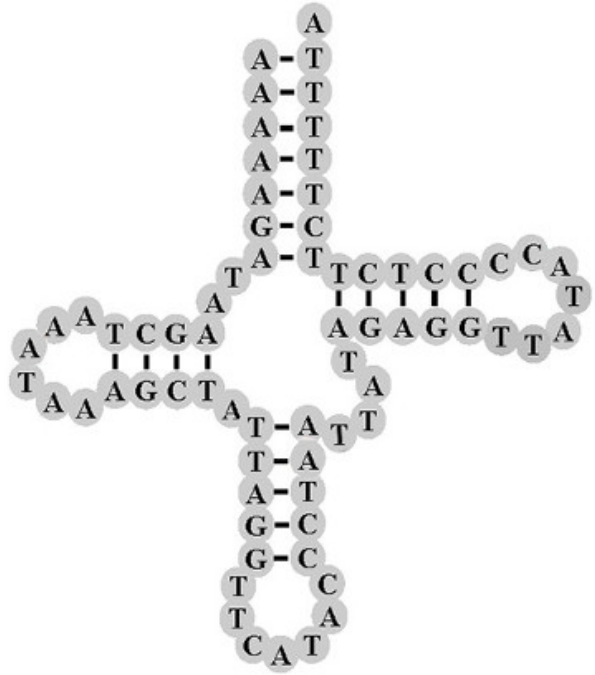
outline

- background
- RNA consensus
- MC-Cons
- future work

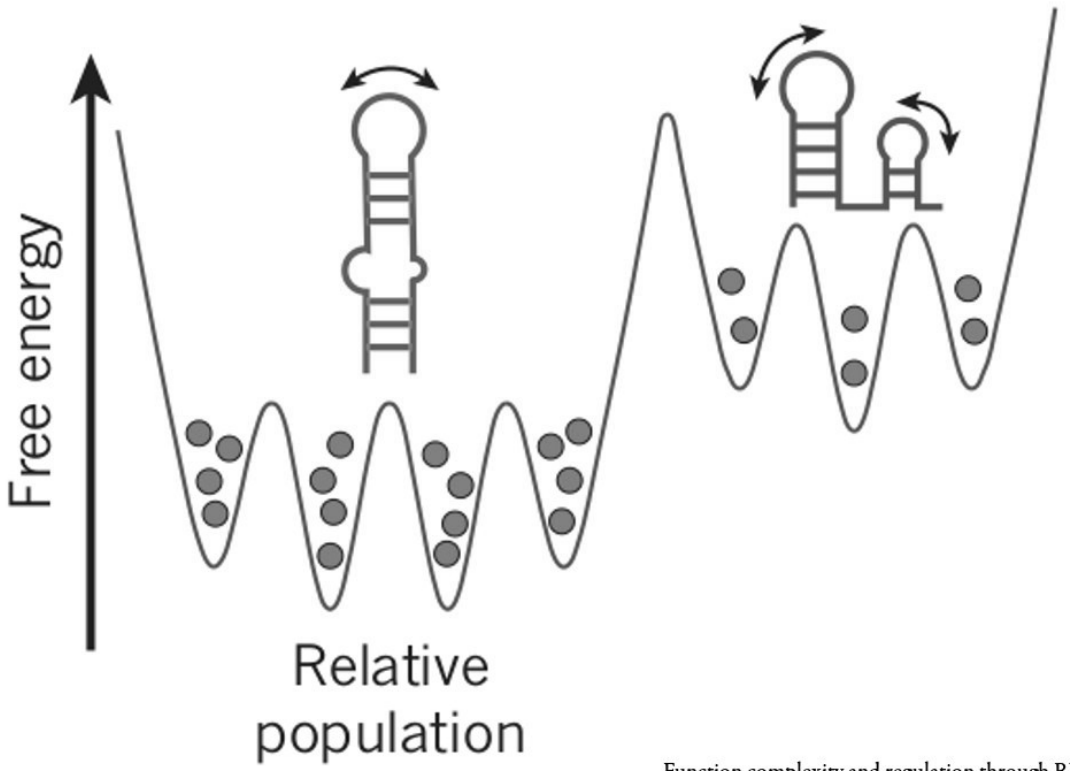
background

many representations



(((((((..(((((.....)))))..(((((.....)))))....(((((.....)))))))))))).

many structures



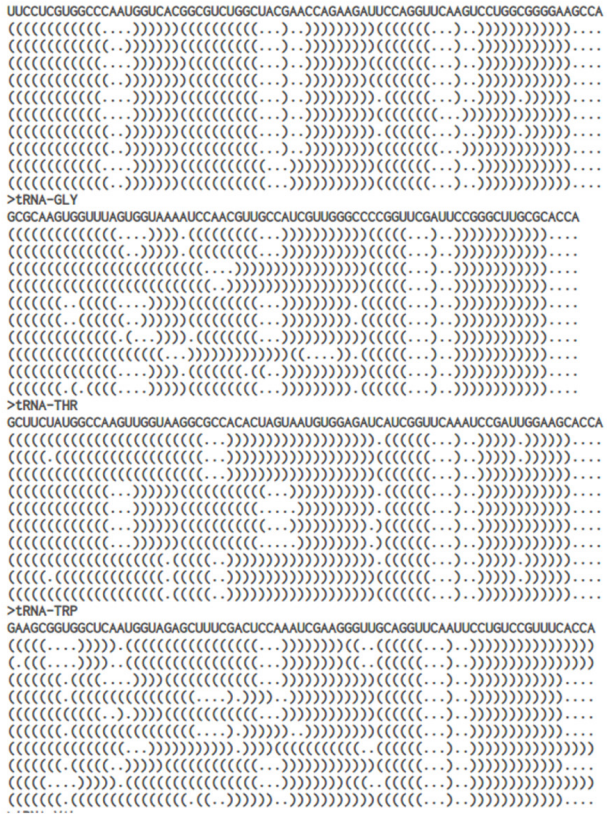
Function complexity and regulation through RNA dynamics
Dethoff EA et al., 2012, Nature

many suboptimals

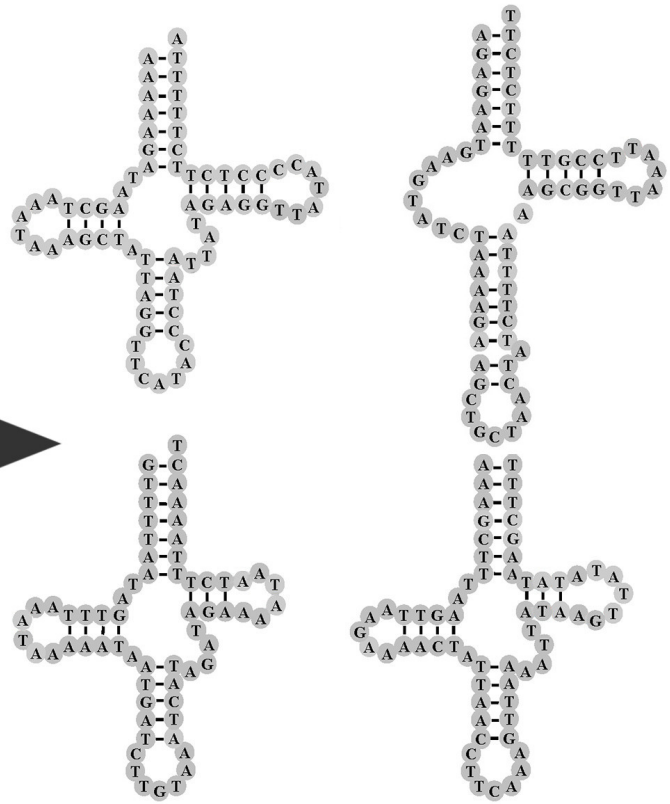
```
>tRNA-ASN
GACUCCAUGGCCAAGUUGGUUAAGGCGUGCGACUGUUAAUCGCAAGAUCGUGAGUUCAACCCUCACUGGGGUCGCCA
.(((((((((((...)))))))))))((((((((((..))))))((((...)..))))))))).. -69.824
(((((((((((...)))))))((((((((.((..))))))))))))((((...)..))))))).... -69.141
.(((((((((((...)))))))))))((((((.((((..))))))((((...)..))))).)))))).. -69.077
(...(((((((((...)))))))))).(.(((((((((((..))))))((((...)..)))))))))). -68.910
.(((((((((((...)))))))))))((((((.((((..)))).((((...)..)))))))))).. -68.872
.(((((((((((...)))))))))))((((((.((((..)))).((((...)..)))))))))).. -68.843
(((((((((((...)))))))((((((((...))))))))))((((...)..))))))).... -68.804
.(((((((((((...)))))))))))((((((...((((..))))((((...)..))))).)))))).. -68.761
.(((((((((((...)))))))))))((((((((((((((..))))))))))))((...)))))).. -68.736
.(((((((((((...)))))))))))((((((.((((((..)))).((((...)..)))))))))).. -68.731
```

RNA consensus

what we want



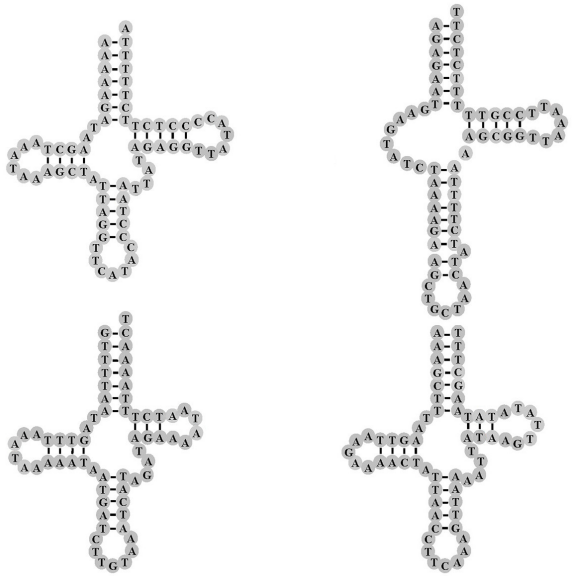
MC-CONS



Comparative Mitogenomics of the Assassin Bug Genus Peirates Reveal Conserved Mitochondrial Genome Organization of P. atromaculatus, P. fulvescens and P. turpis,
Zhao G, Li H, Zhao P, Cai W, 2015, Plos One

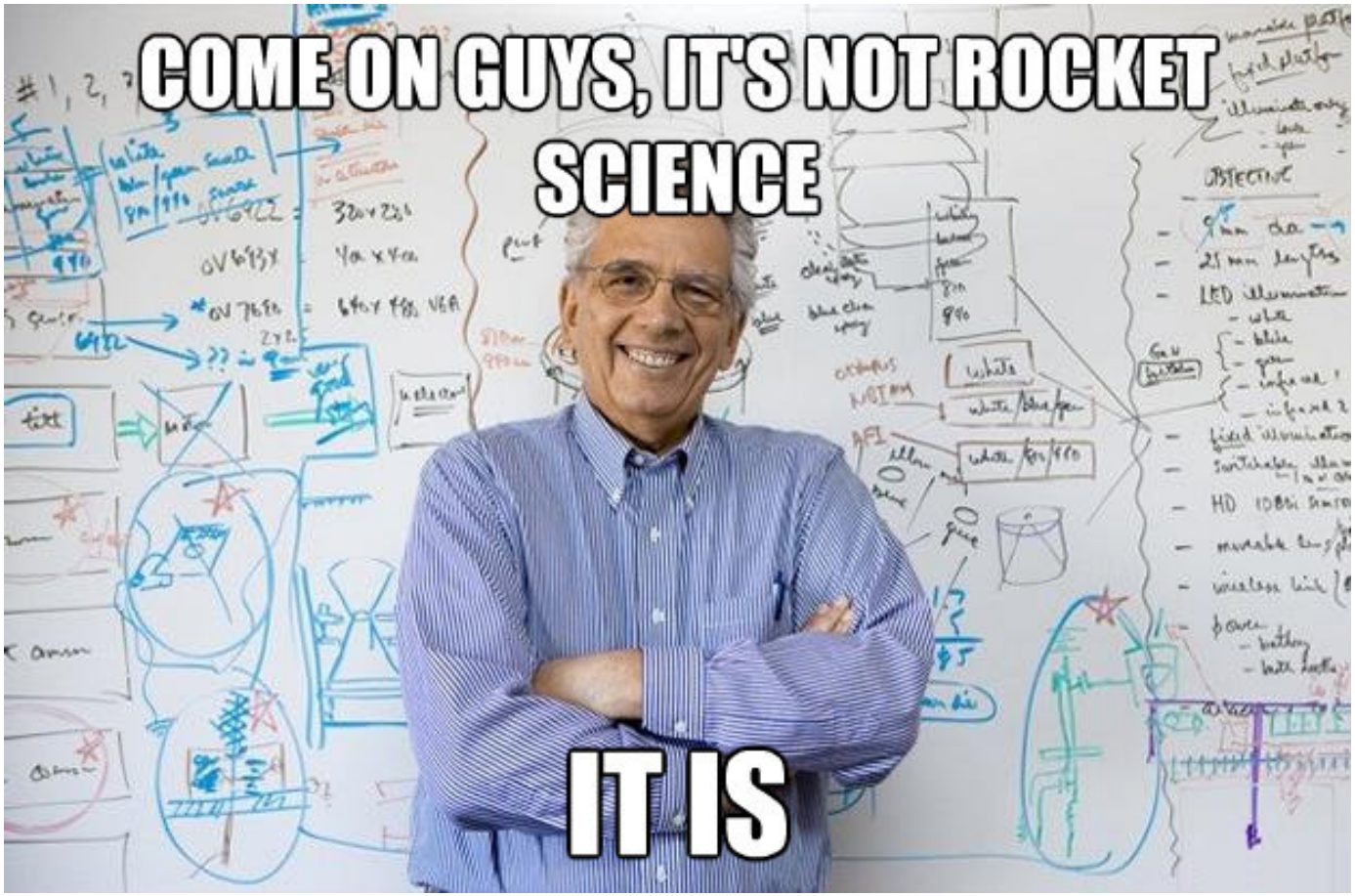
MC-Cons

the approach

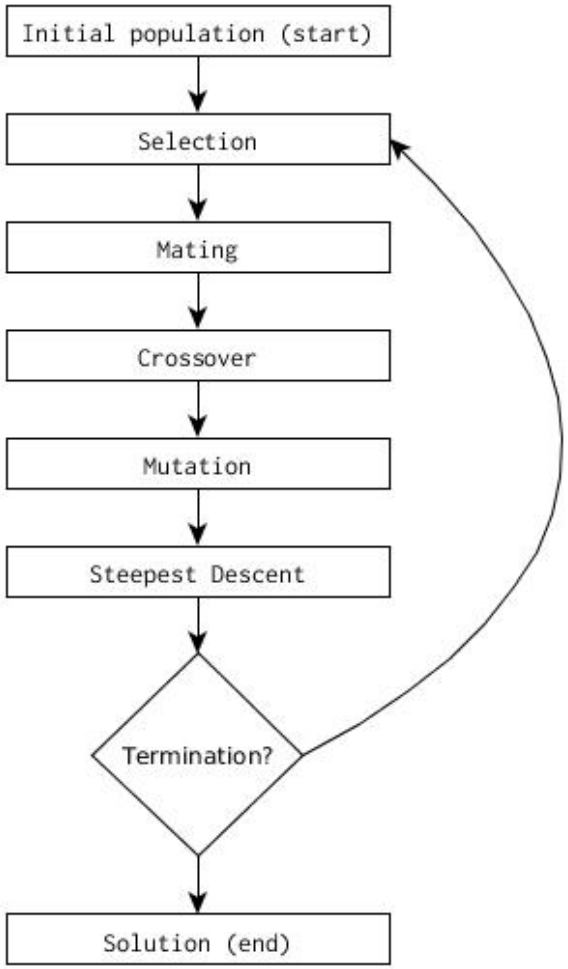


- find pertinent distance function(s)
- minimize the sum of pairwise distances

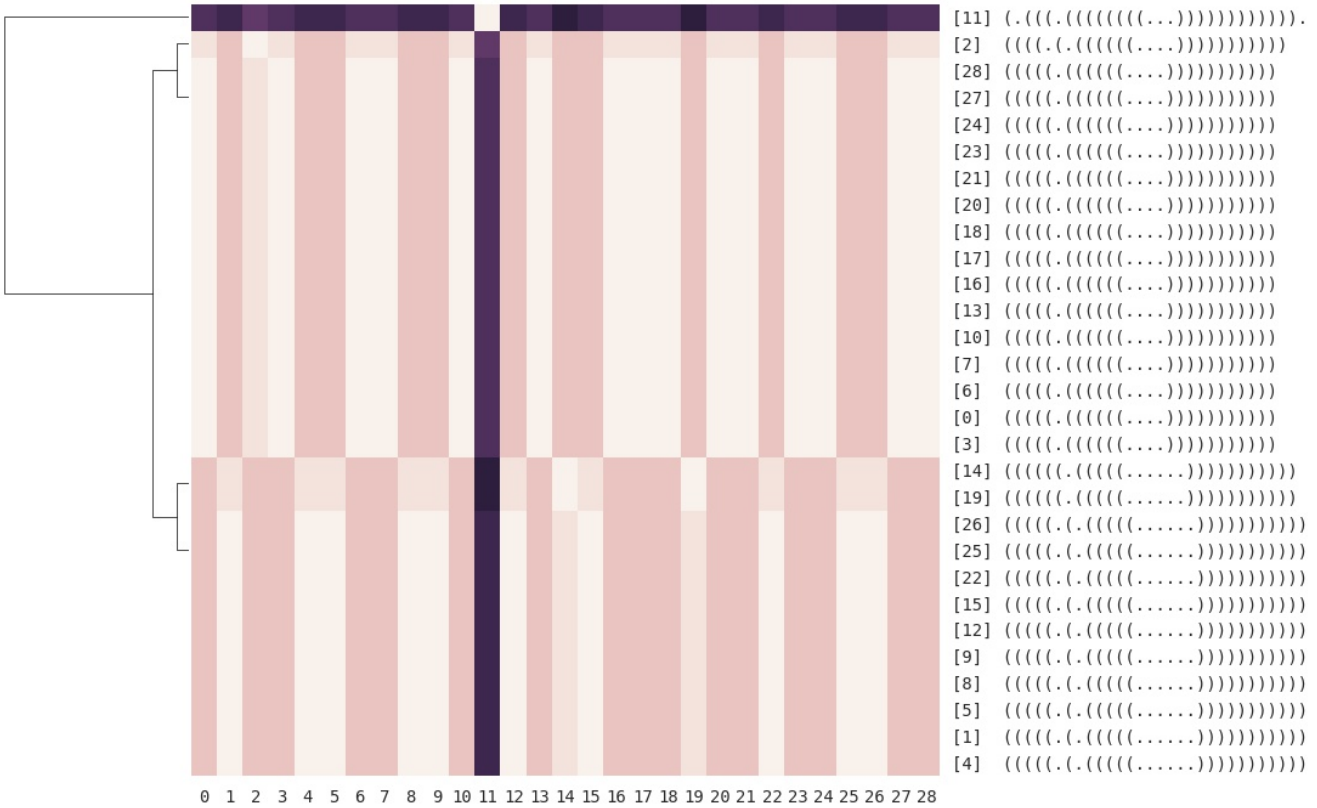
how hard is this?



good enough


Initial population (start)
Selection
Mating
Crossover
Mutation
Steepest Descent
Termination?
Solution (end)

example: IREs



example: microRNAs

future work

future work

- multi-objective option
- new distance functions
- parallelism
- user feedback (learning)

questions