MC-Cons 2.0

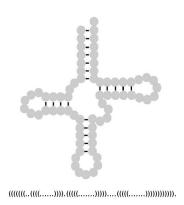
Gabriel Parent

introduction

introduction 2/18

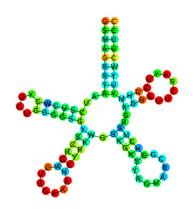
I work with 2D structures





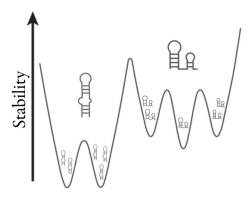
introduction 3/18

RNA families



introduction 4/18

one RNA has many structures



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

introduction 5/18

softwares predict structure

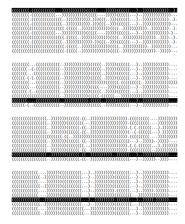
- MC-Fold
- mfold
- dozens of others

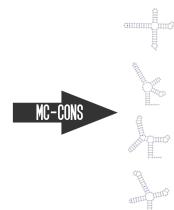
introduction 6/18

MC-Cons

MC-Cons 7/18

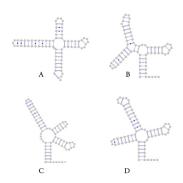
RNA consensus





MC-Cons 8/18

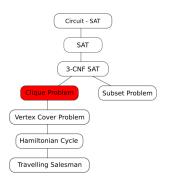
computational approach



_				
	A	В	U	D
A	0	5	3	4
В		0	3	4
С			0	2
D				0
score = 42				

MC-Cons 9/18

it is very hard!



- result is the solution to max-clique
- exponential growth on input size

MC-Cons 10/18

A



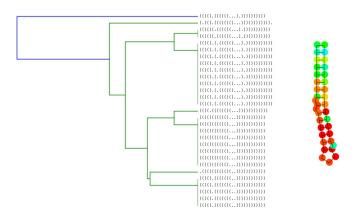
- hybrid genetic algorithm
- local search

MC-Cons 11/18

results

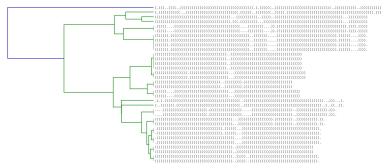
results 12/18

toy example: IREs



results 13/18

example: microRNAs



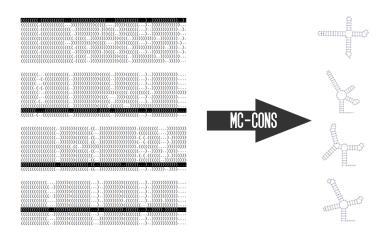


results 14/18

conclusion

conclusion 15/18

summary



conclusion 16/18

future work

- improved distance functions
- multi-objective optimization
- relevance feedback

conclusion 17/18

questions



conclusion 18/18