

Protein-RNA co-evolution sites are close in 3D space

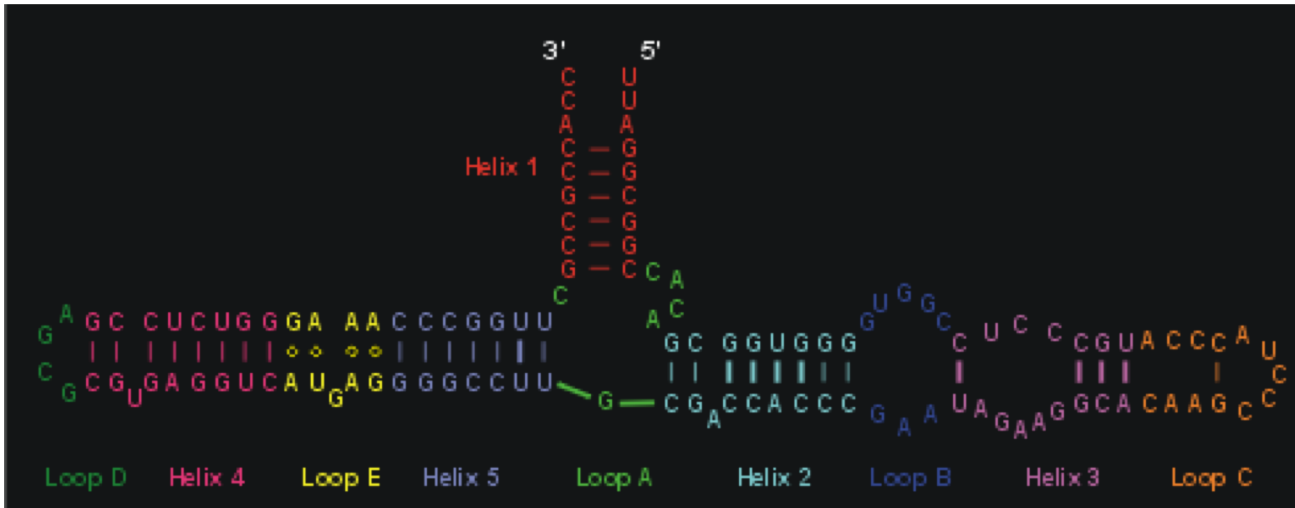
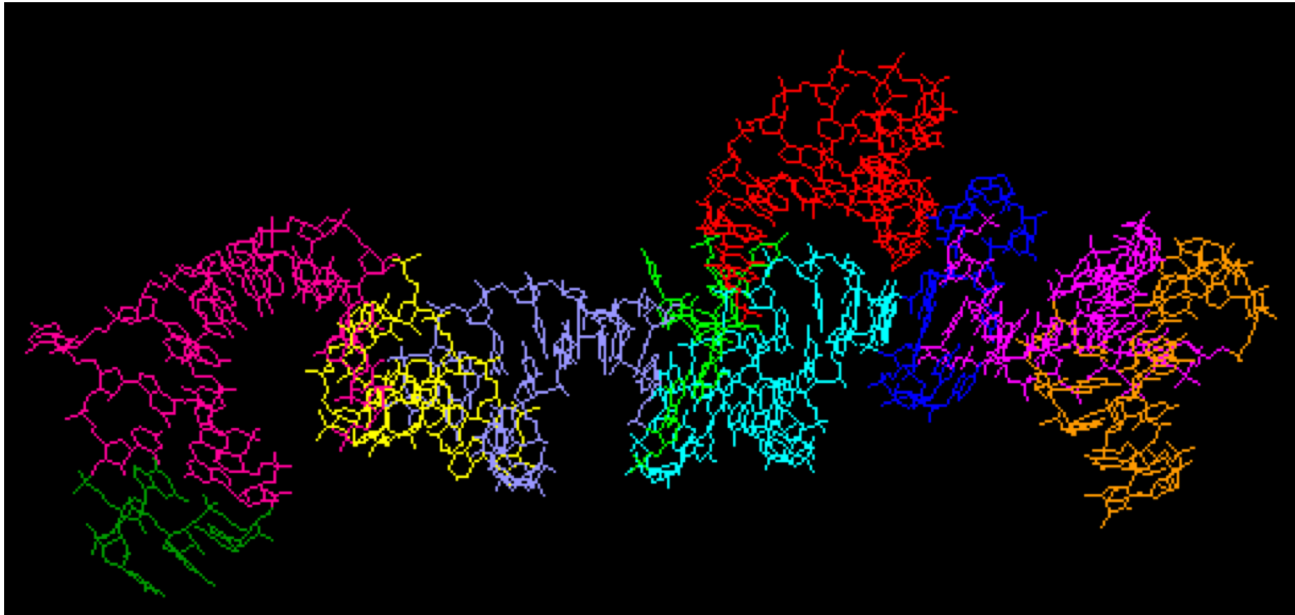
Zhichao (Chichau) Miao

Brazma lab – EBML-EBI

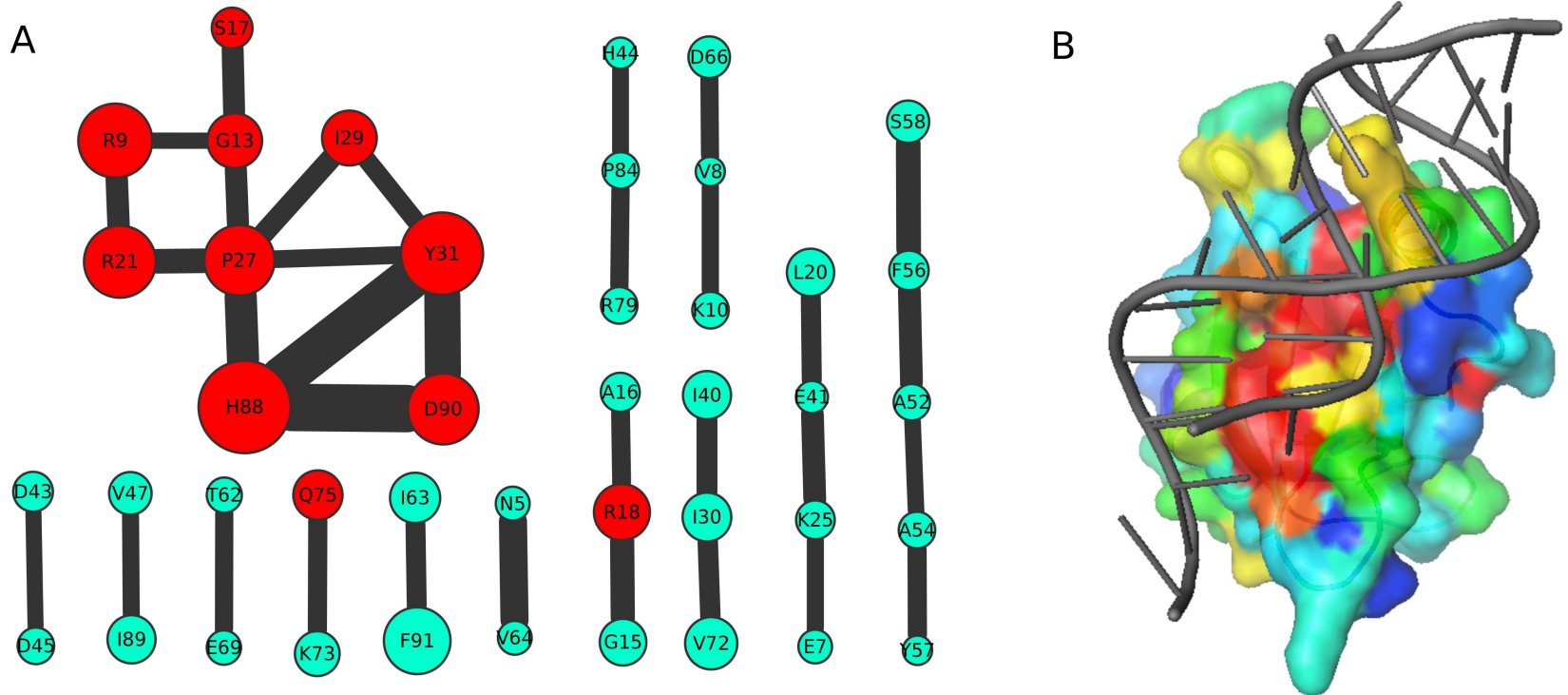
Teichmann lab – Wellcome
Sanger Institute

Benasque 2018

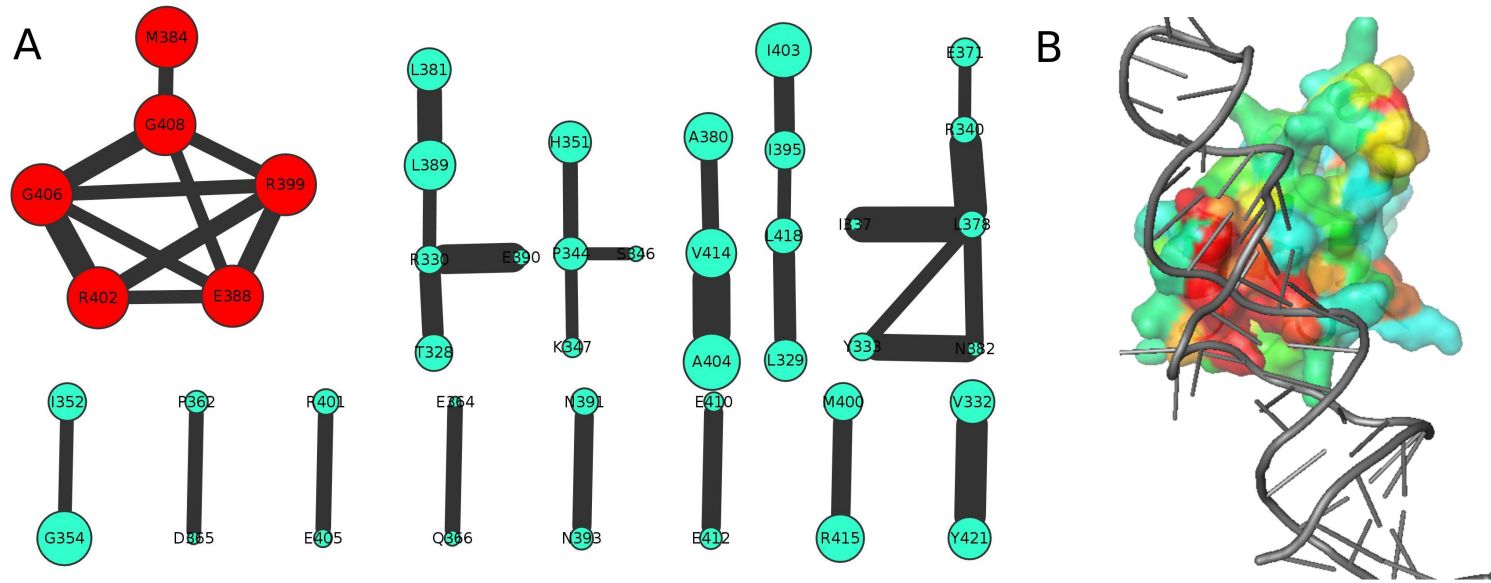
5S rRNA



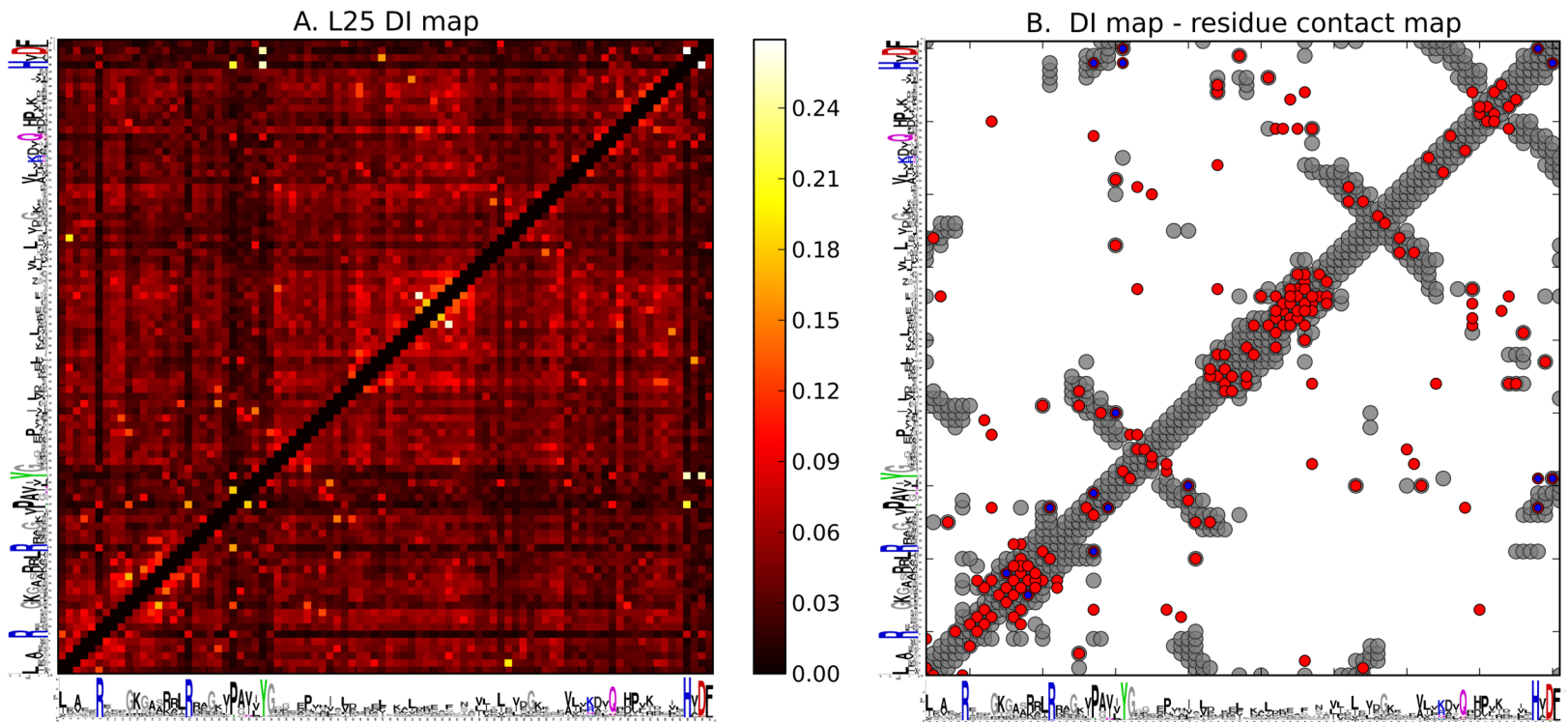
Co-evolution of the protein binding sites



SRP – RNA binding



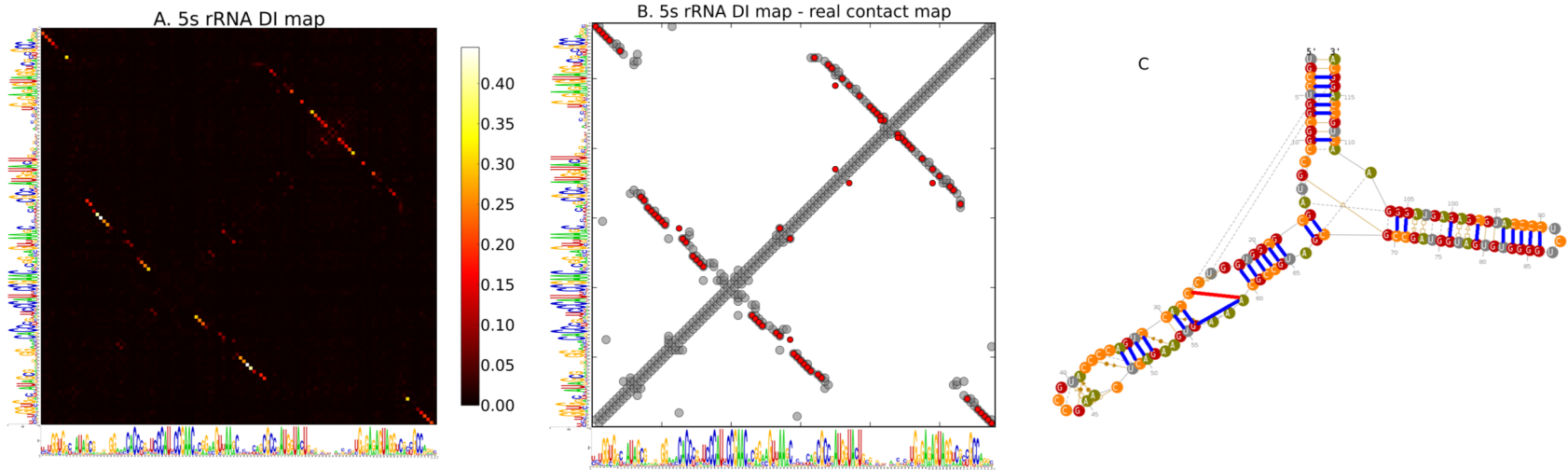
Validation of DCA on L25 protein



PNAS December 6, 2011. 108 (49)
E1293-E1301

PLOS Computational Biology 9(8):
e1003176

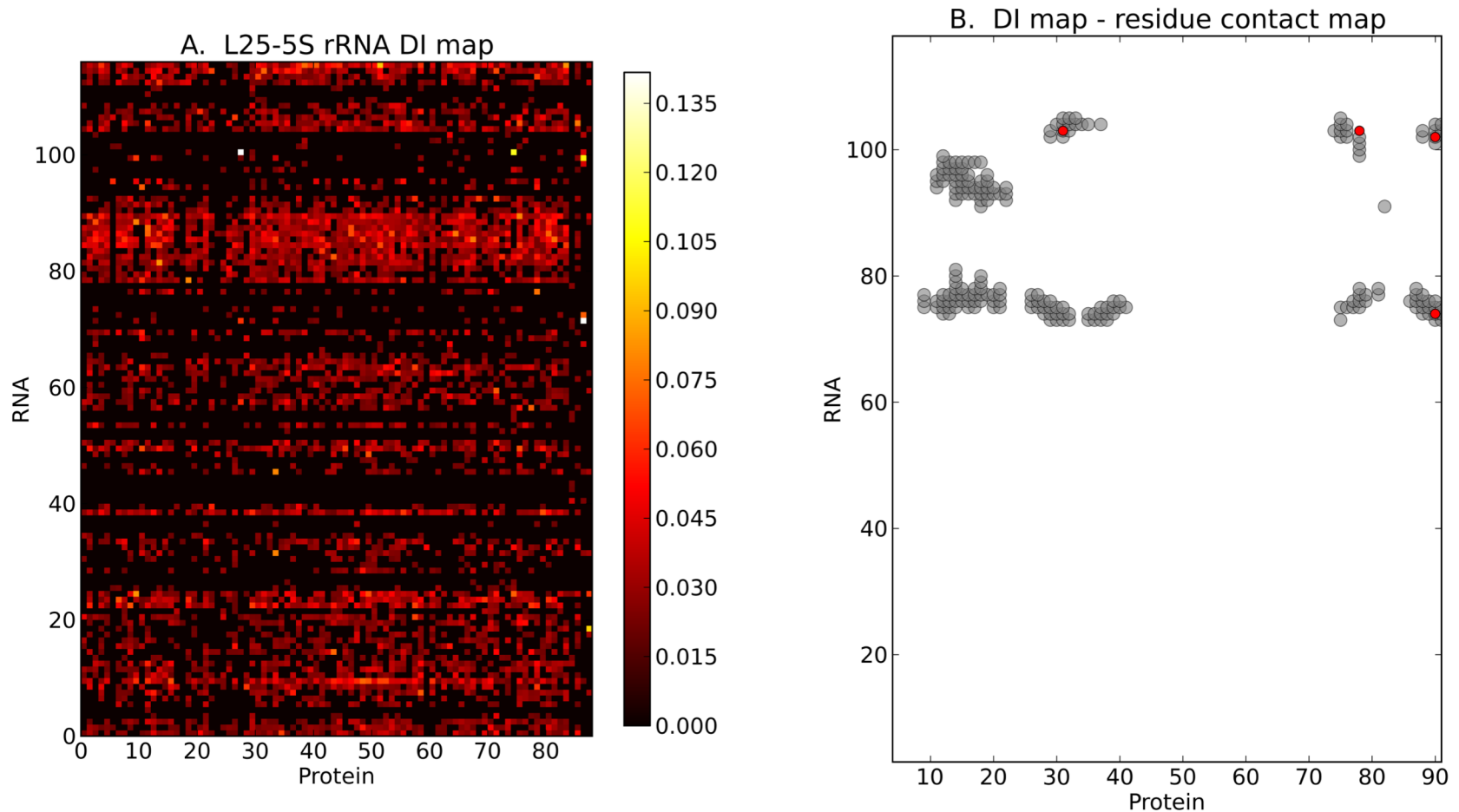
Validation of DCA on 5S rRNA



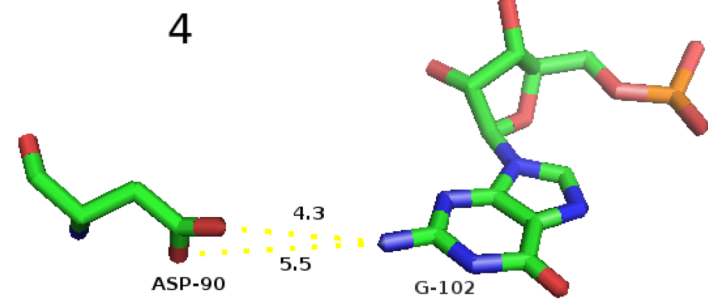
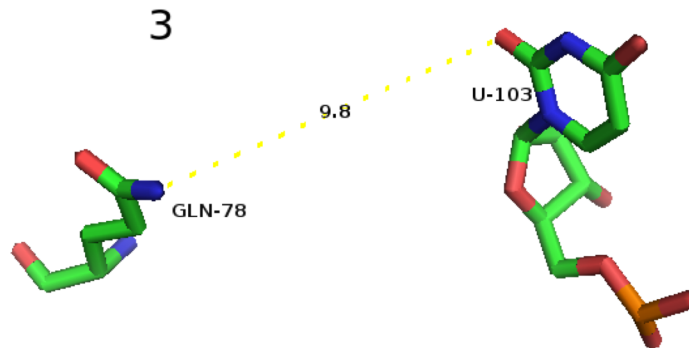
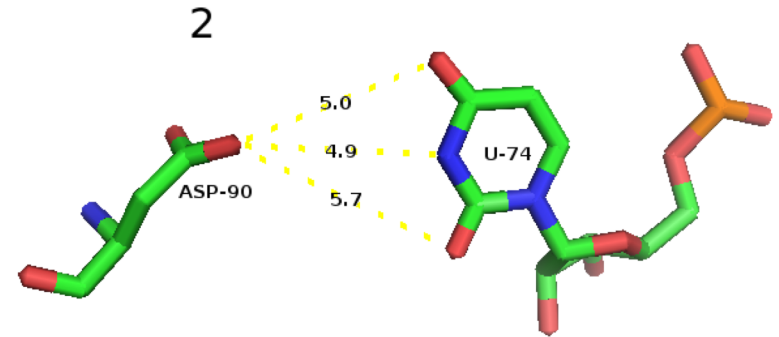
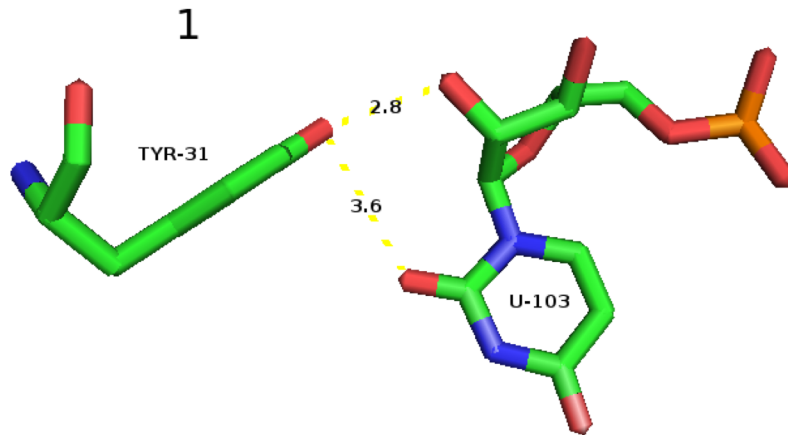
Nucleic Acids Research, Volume 43, Issue
21, 10444–10455

Cell , Volume 165 , Issue 4 , 963 - 975

Protein-RNA interaction

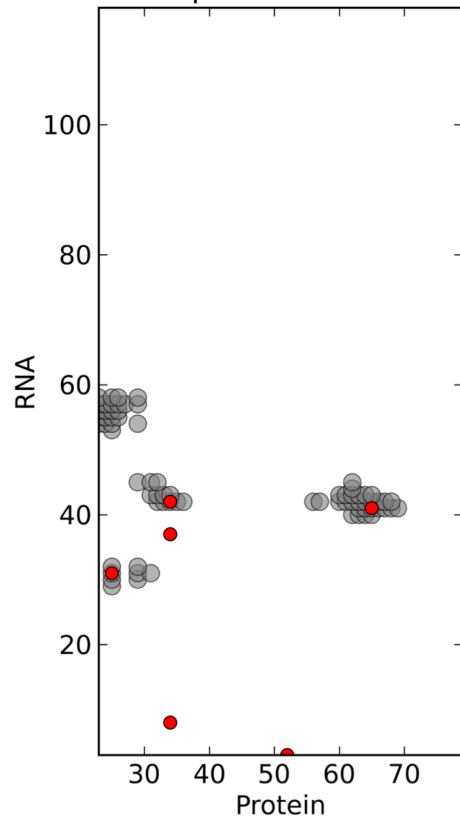


The interactions recaptured

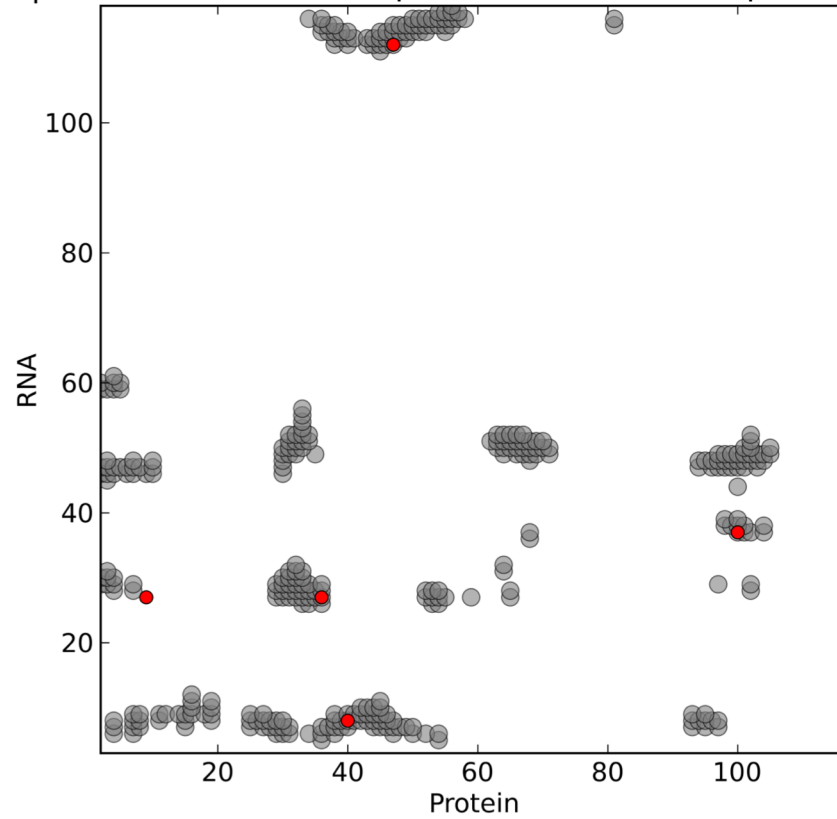


L5 and L18 are also effective

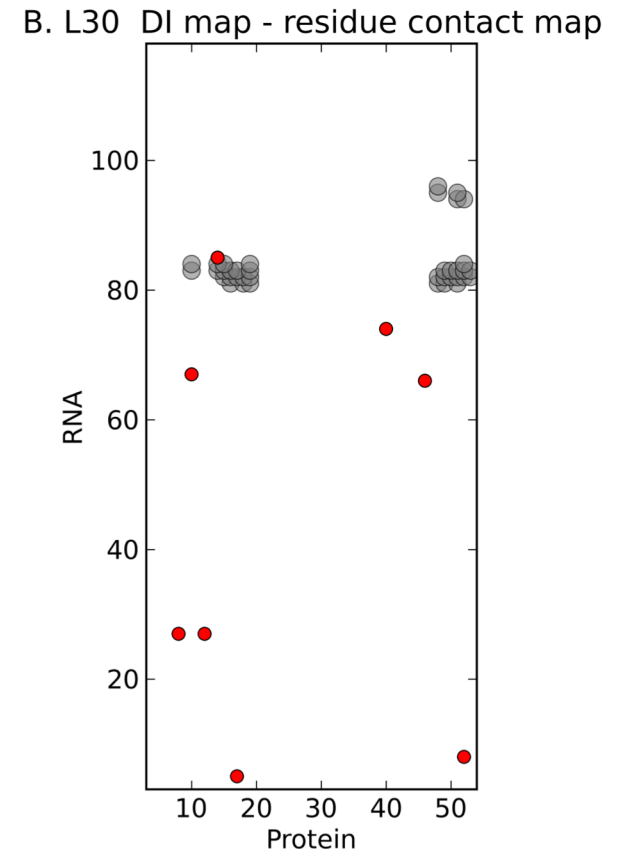
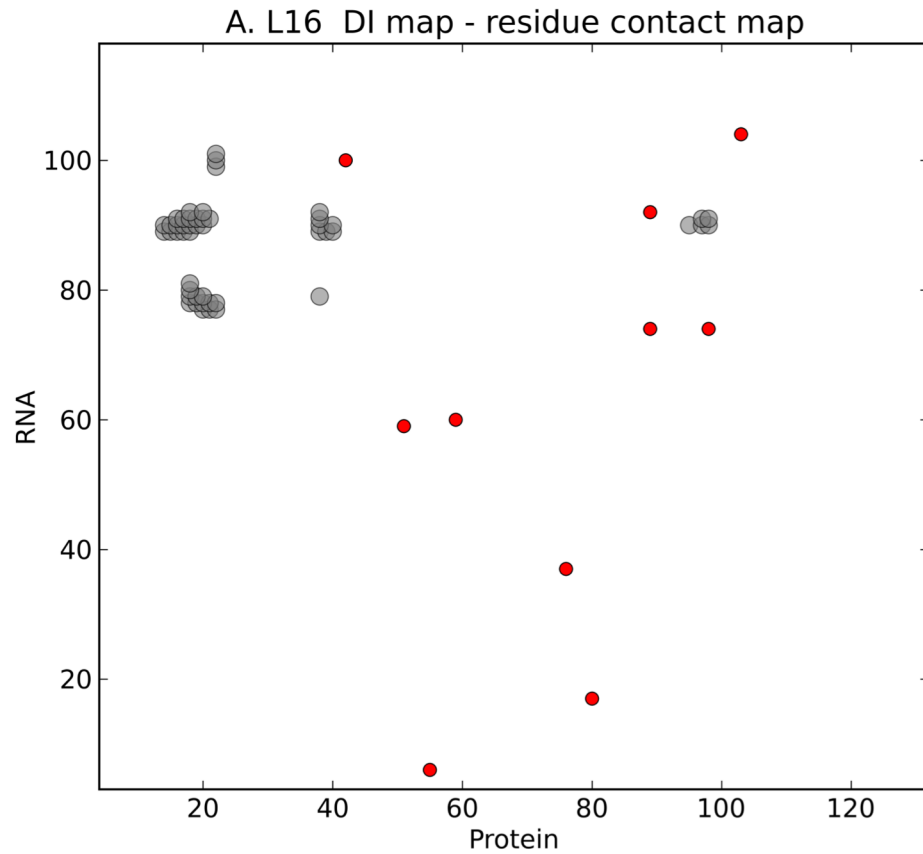
A. L5 DI map - residue contact map



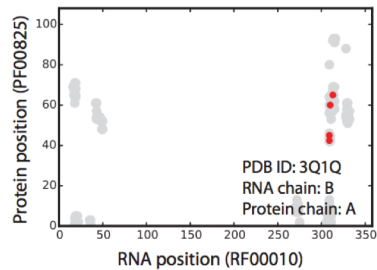
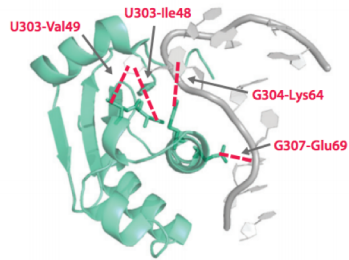
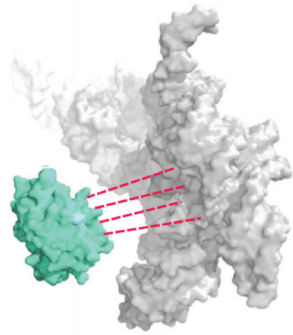
B. L18 DI map - residue contact map



L16 and L30 as negative controls



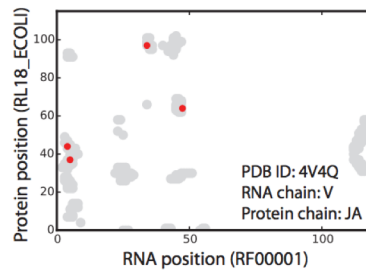
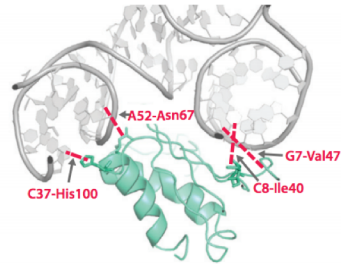
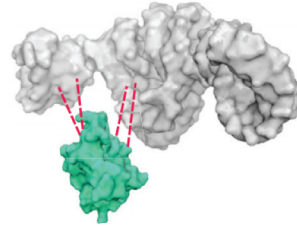
RNase P



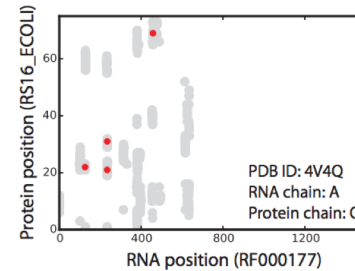
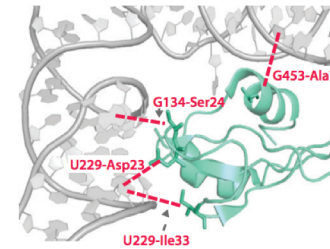
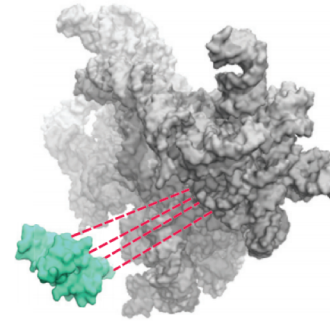
Ribosome

5S rRNA - RL18 protein

Protein ■ RNA ■



16S rRNA - RS16 protein



All known contacts (< 10 Å) ● Top 4 EC predicted contacts ●

Weinreb, Caleb et al.
Cell, Volume 165,
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