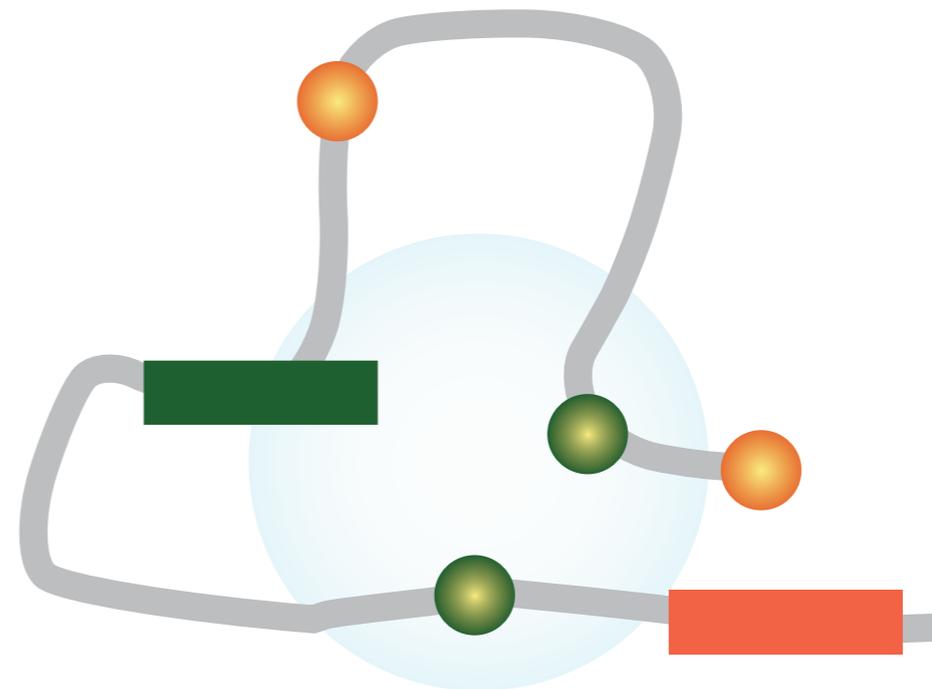
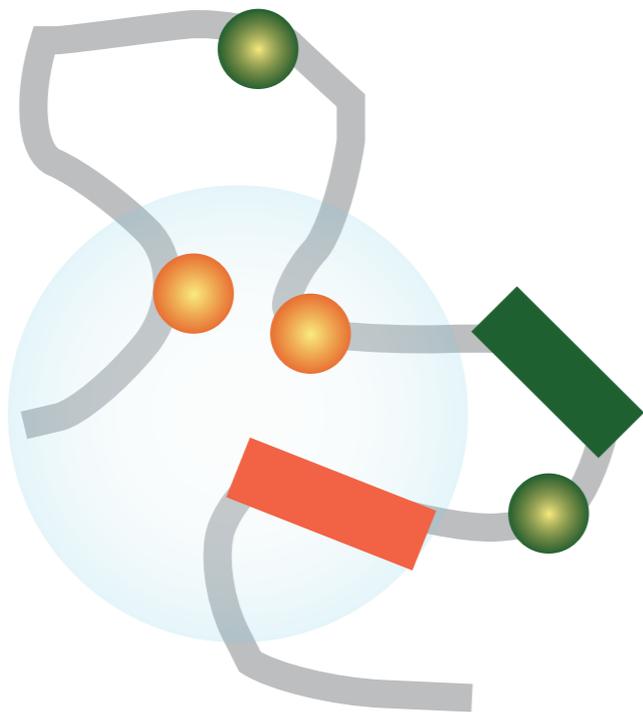


Modeling 3D genomes:
**Determination of hormone
induced structural changes
in TADs**

Marc A. Marti-Renom

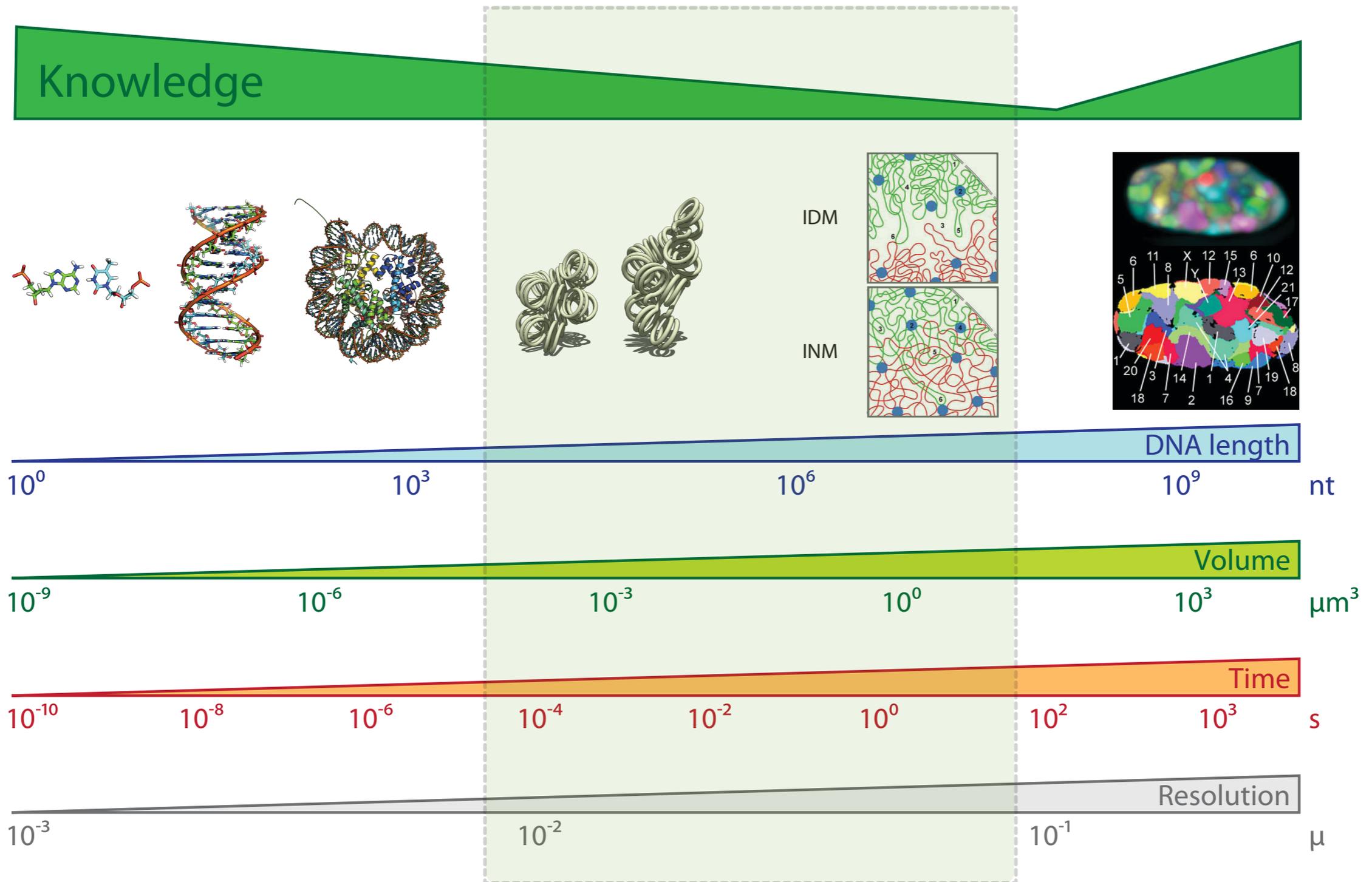
*Genome Biology Group (CNAG)
Structural Genomics Group (CRG)*

Complex genome organization



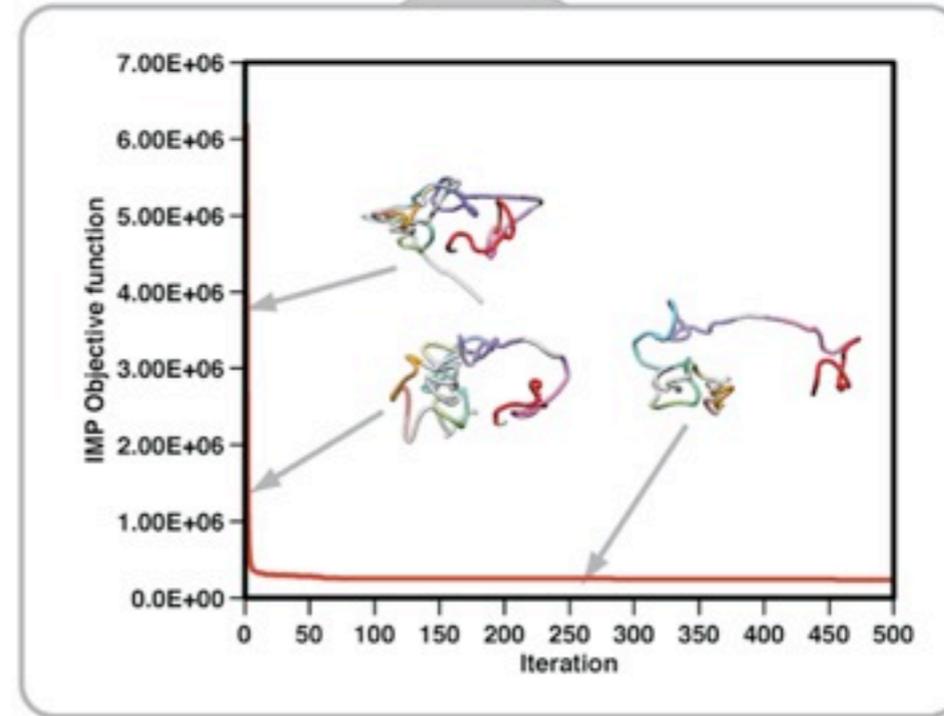
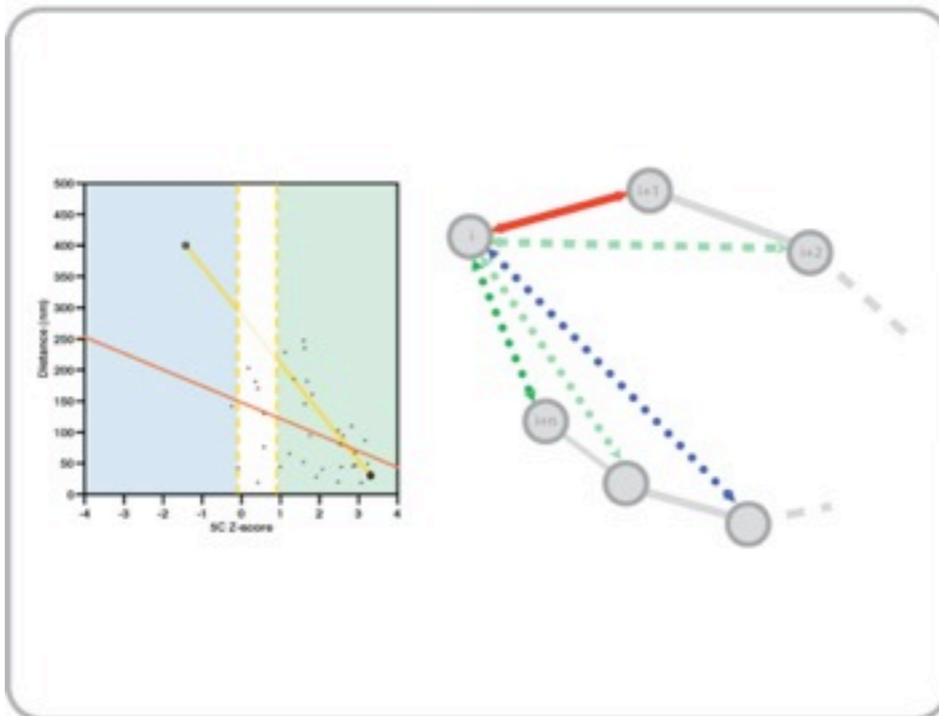
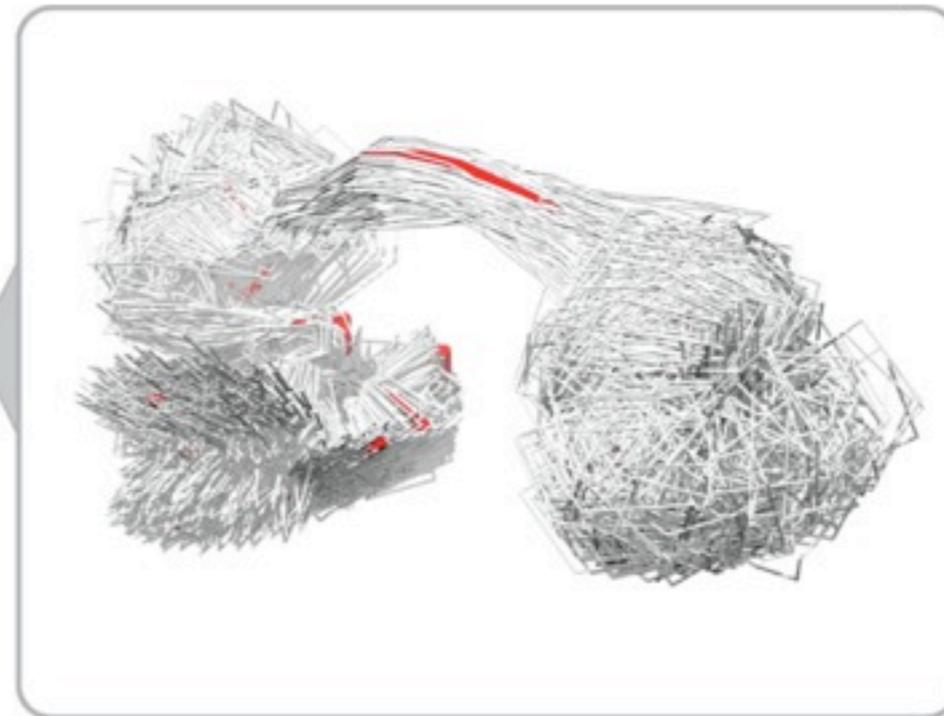
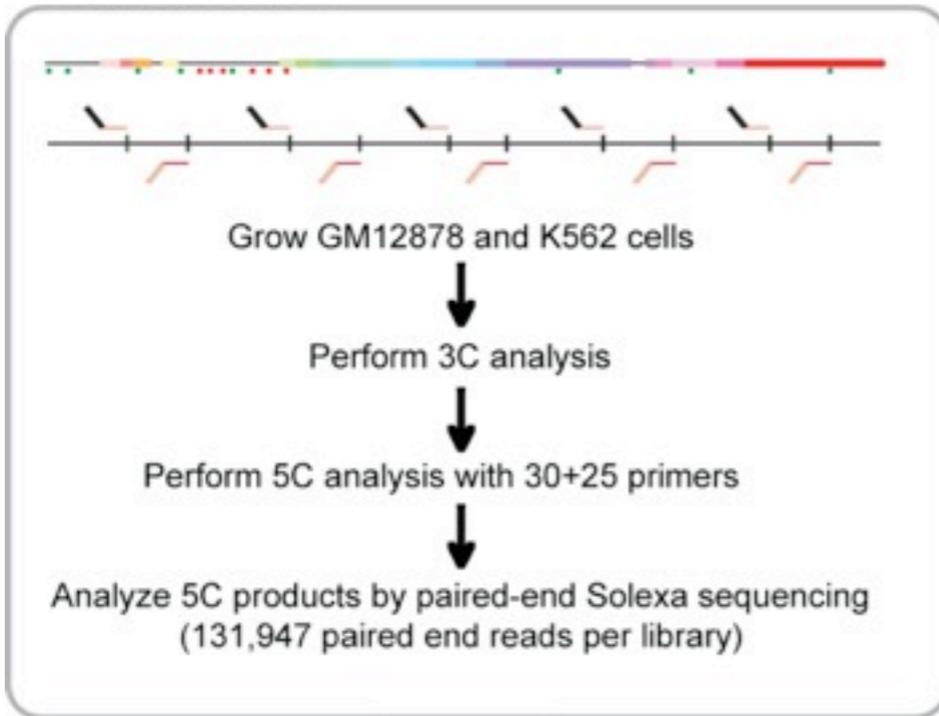
Resolution Gap

Marti-Renom, M. A. & Mirny, L. A. PLoS Comput Biol 7, e1002125 (2011)

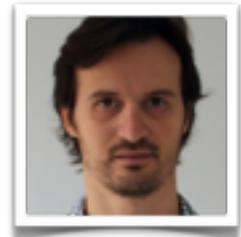




Experiments



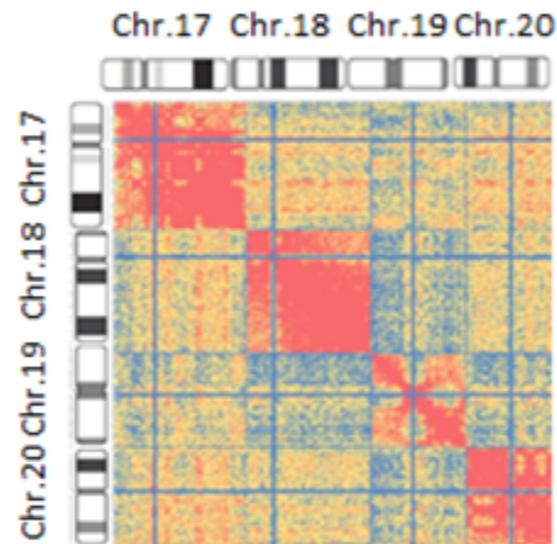
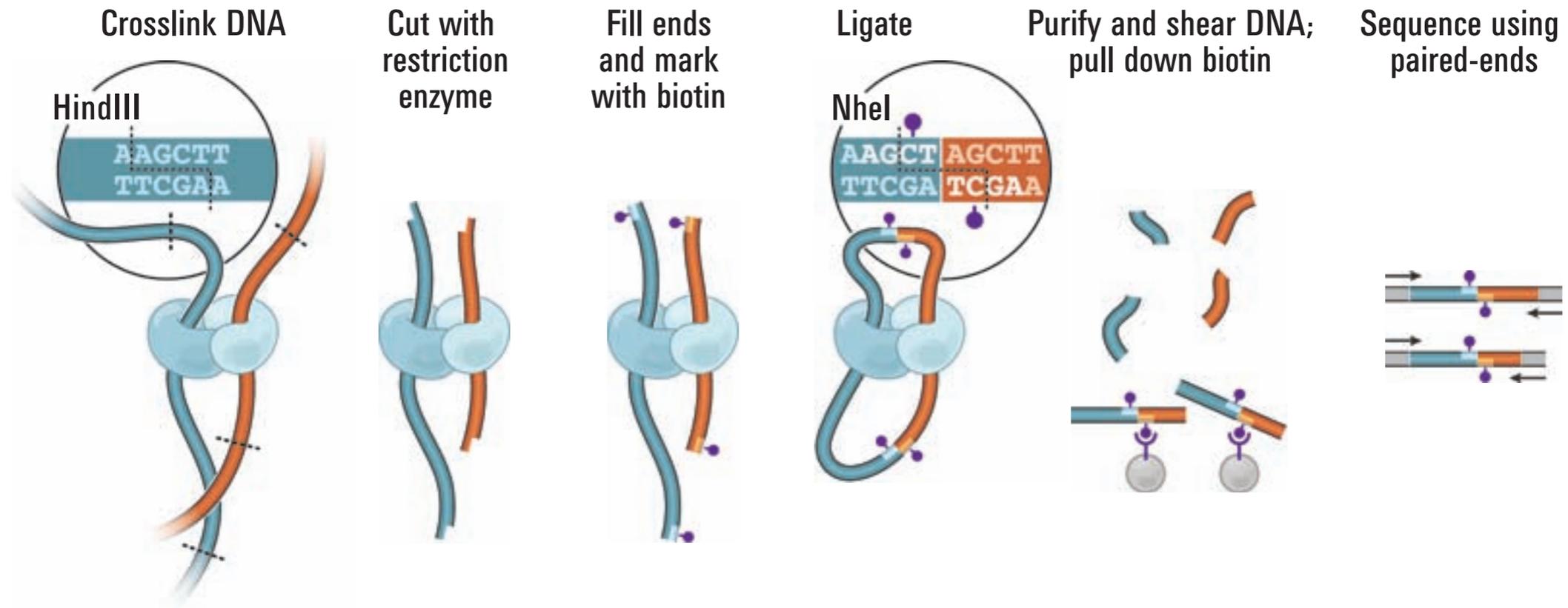
Computation



Hi technology

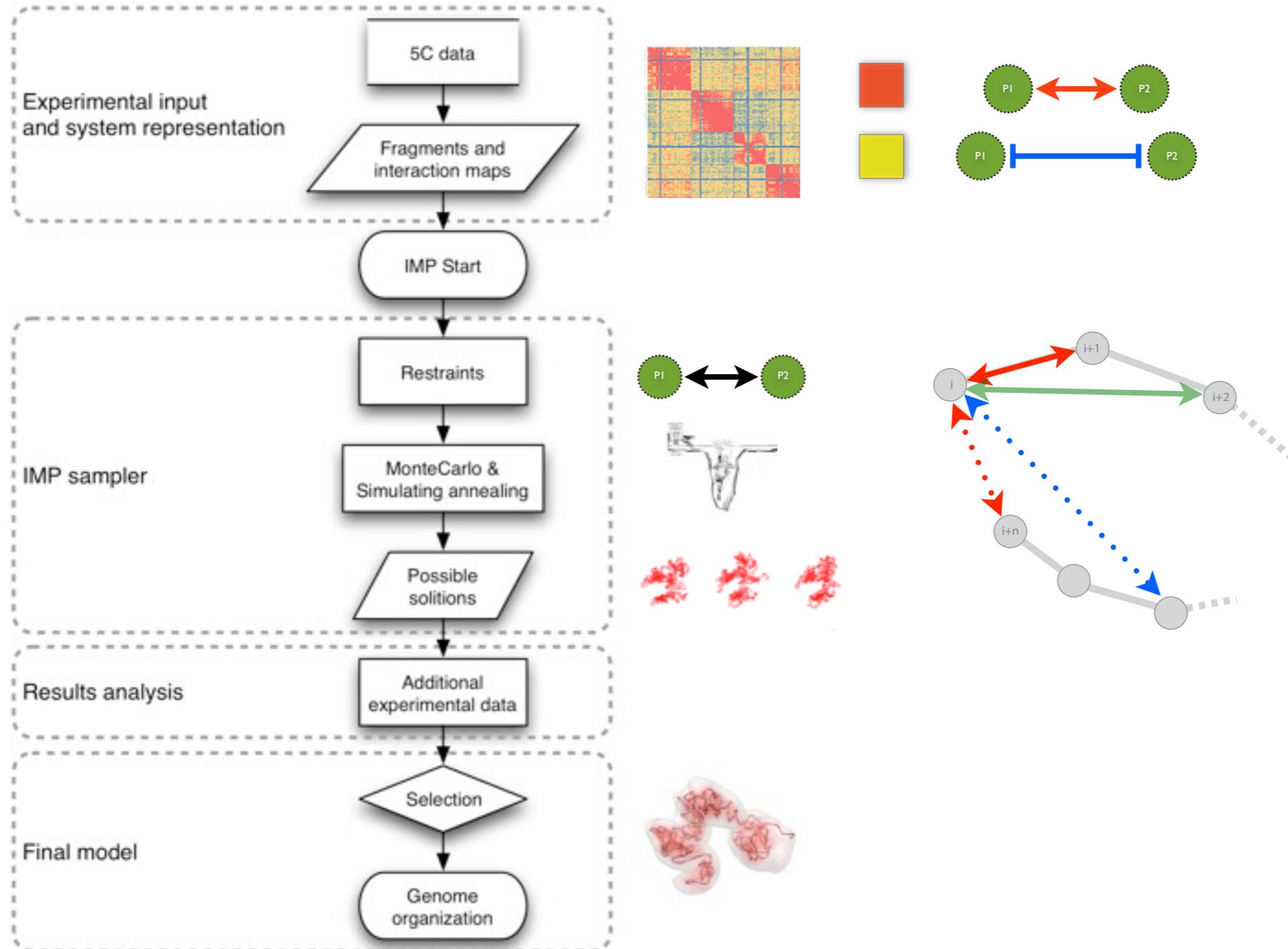
Lieberman-Aiden, E. et al. *Science* 326, 289–293 (2009).

<http://3dg.umassmed.edu>



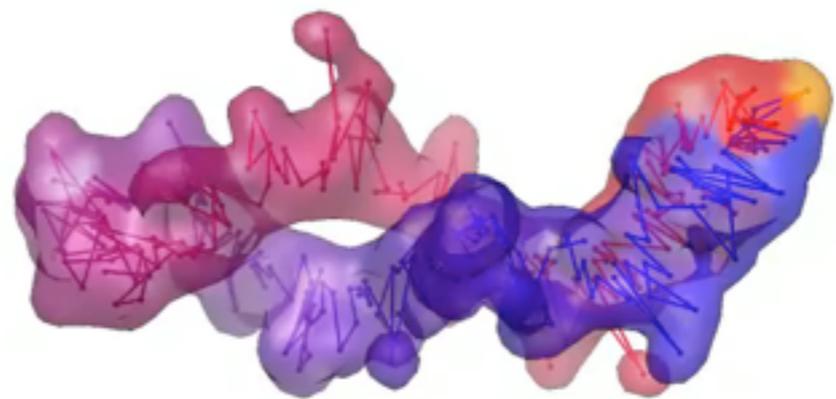
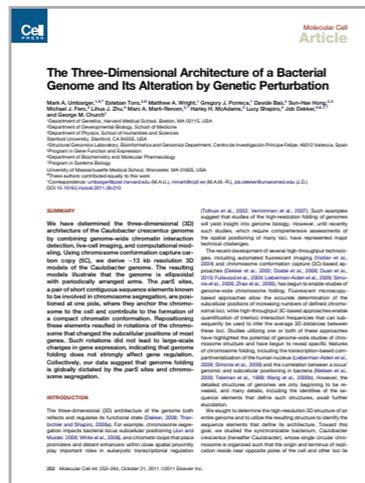
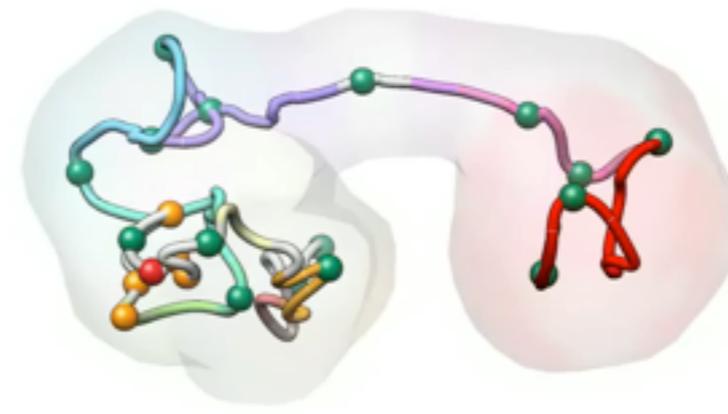
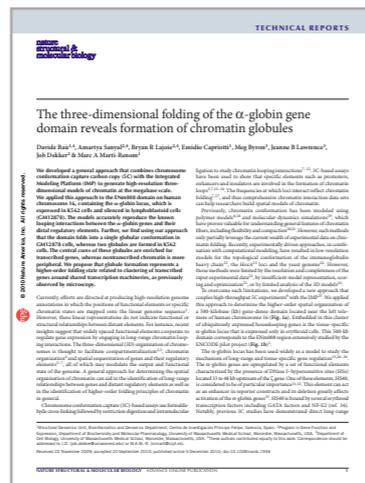
Integrative Modeling

<http://www.integrativemodeling.org>

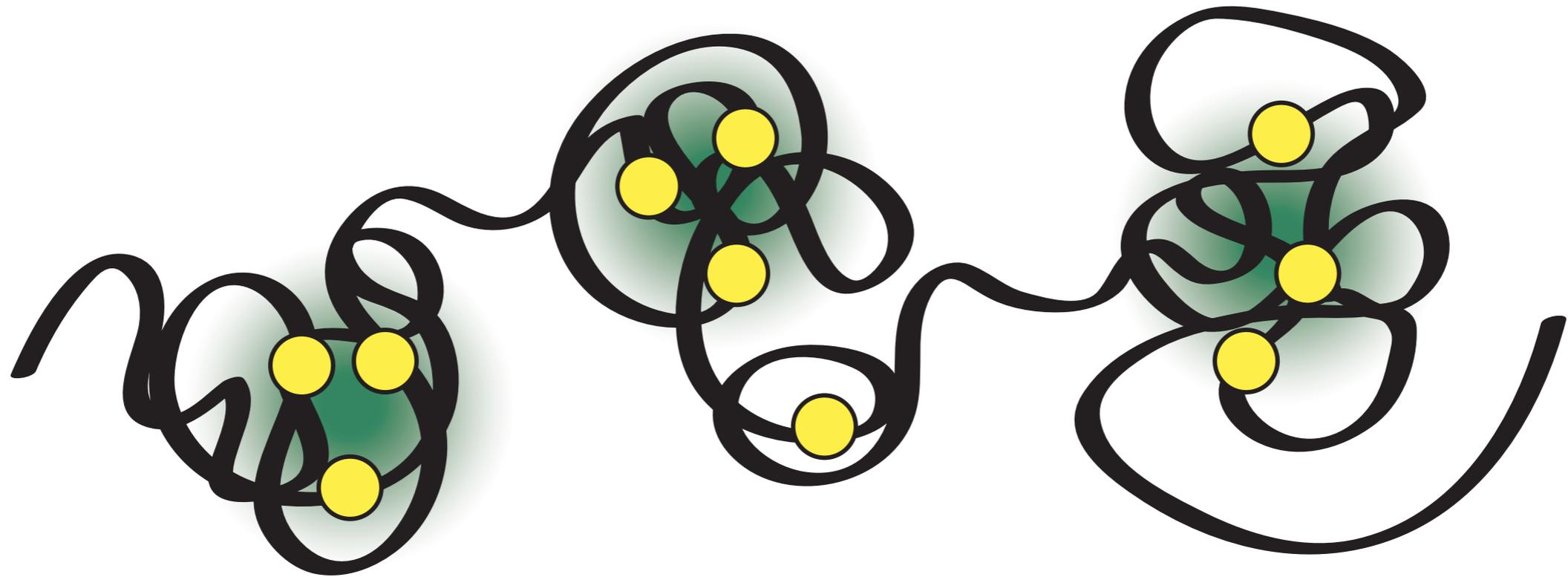


Previous applications...

Baù, D. et al. Nat Struct Mol Biol (2011).
Umbarger, M. A. et al. Mol Cell (2011).



3D TAD response to hormone



Davide Baù



François le Dily



Miguel Beato

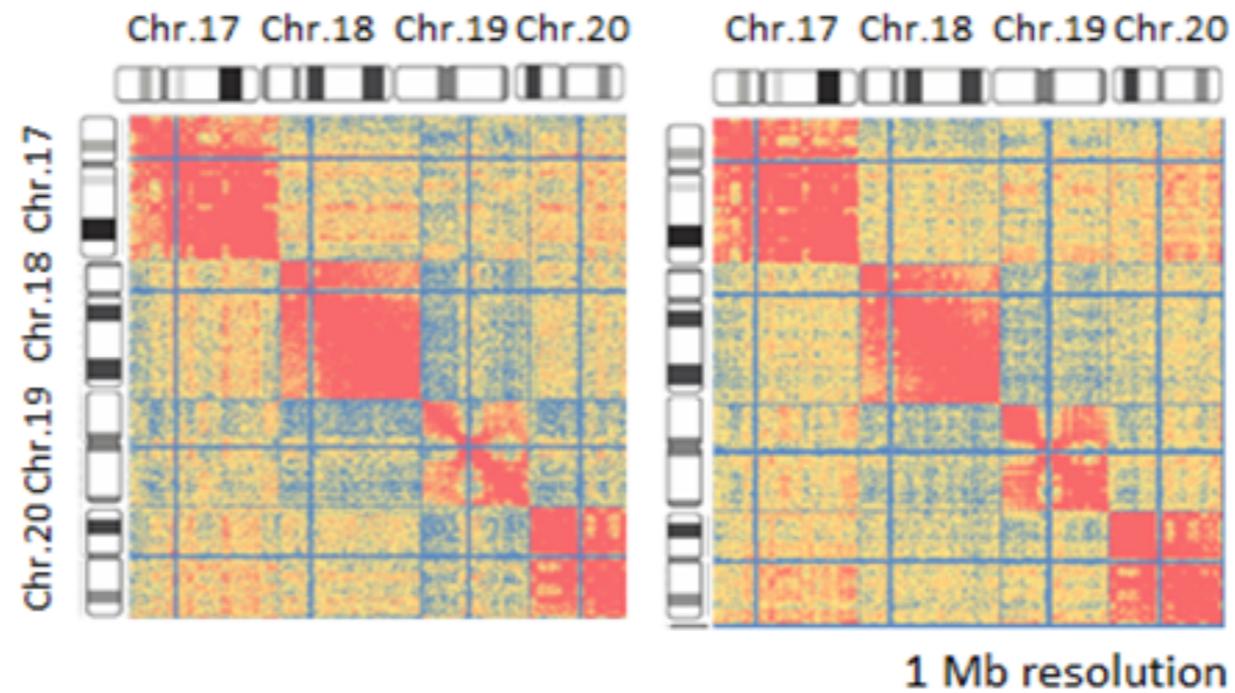
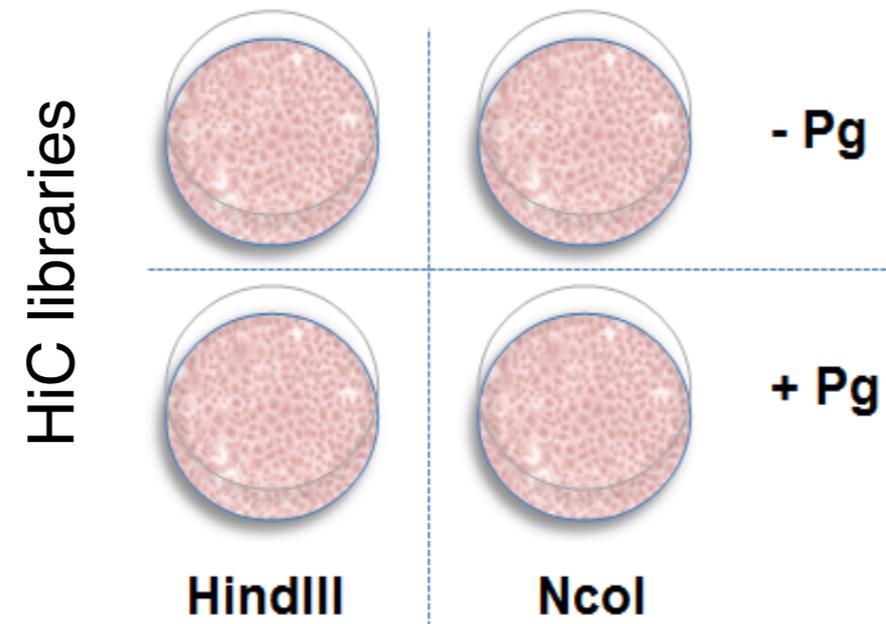
Chromatin and Gene Expression Group (CRG)



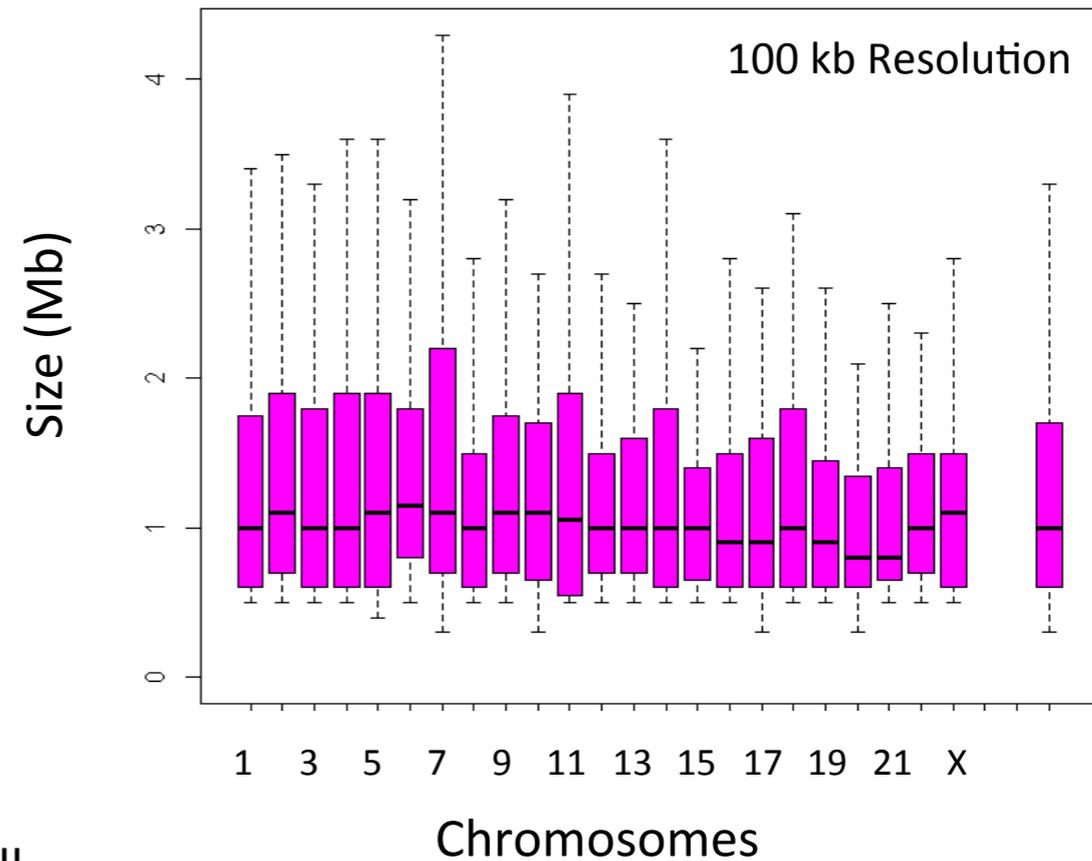
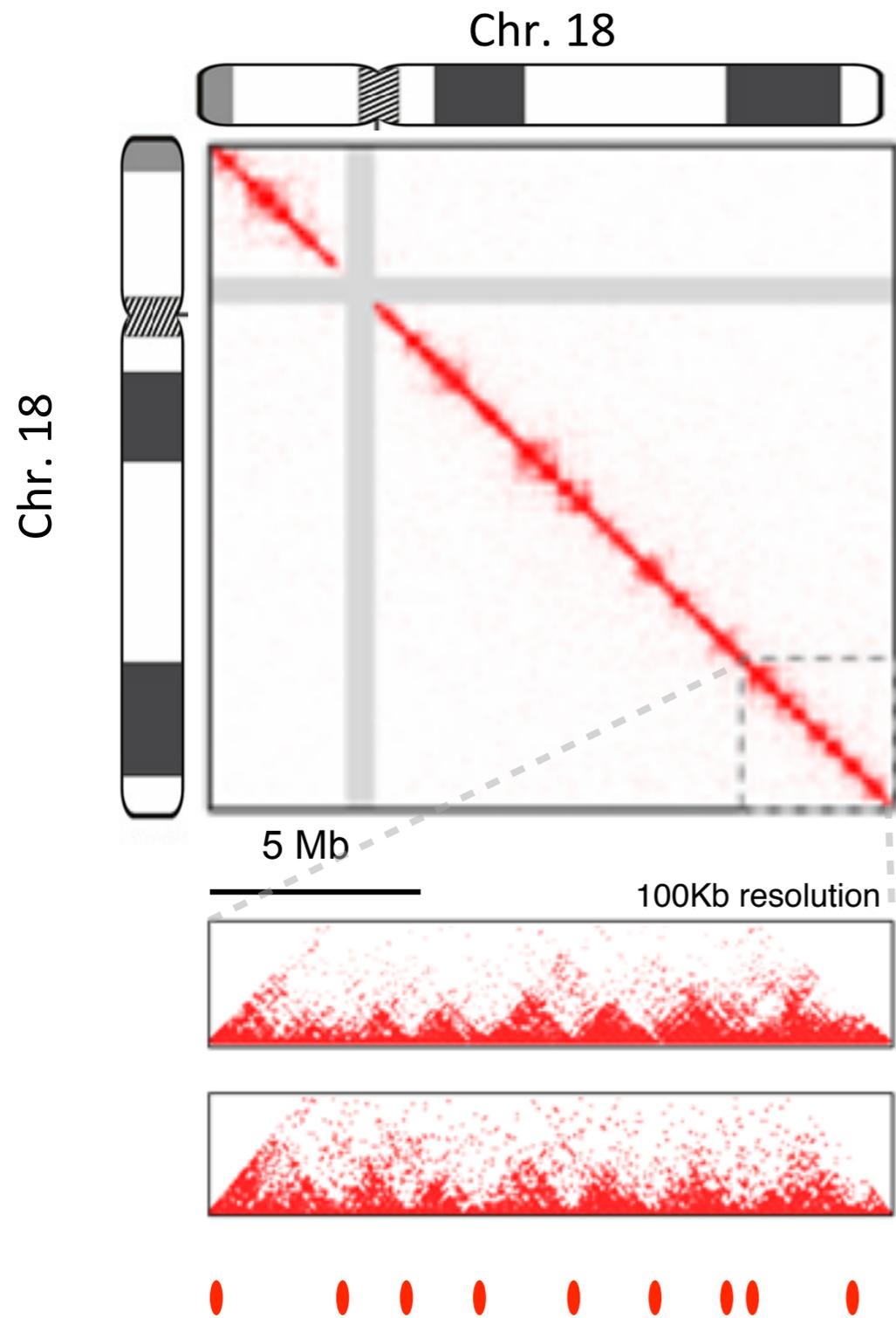
Guillaume Filion

Genome Architecture Group (CRG)

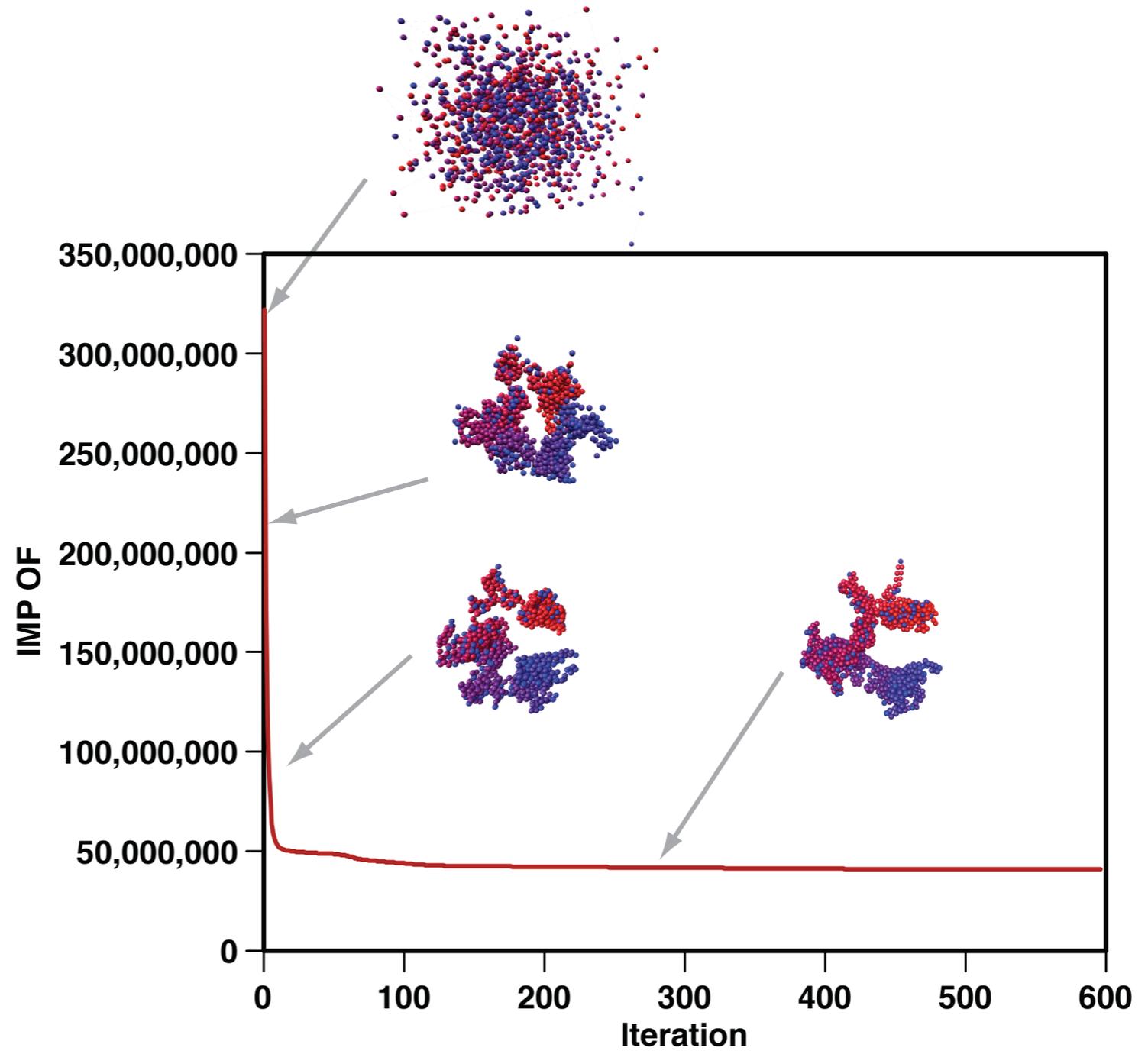
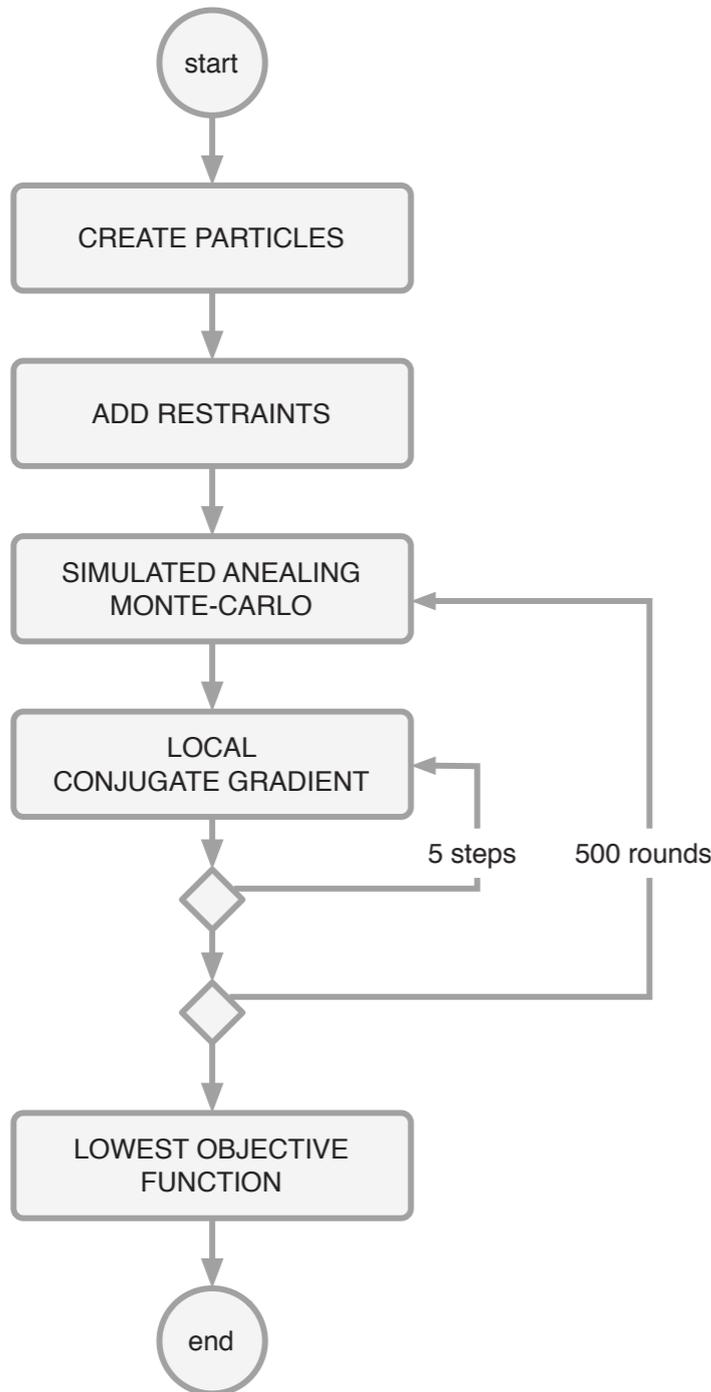
Experimental design



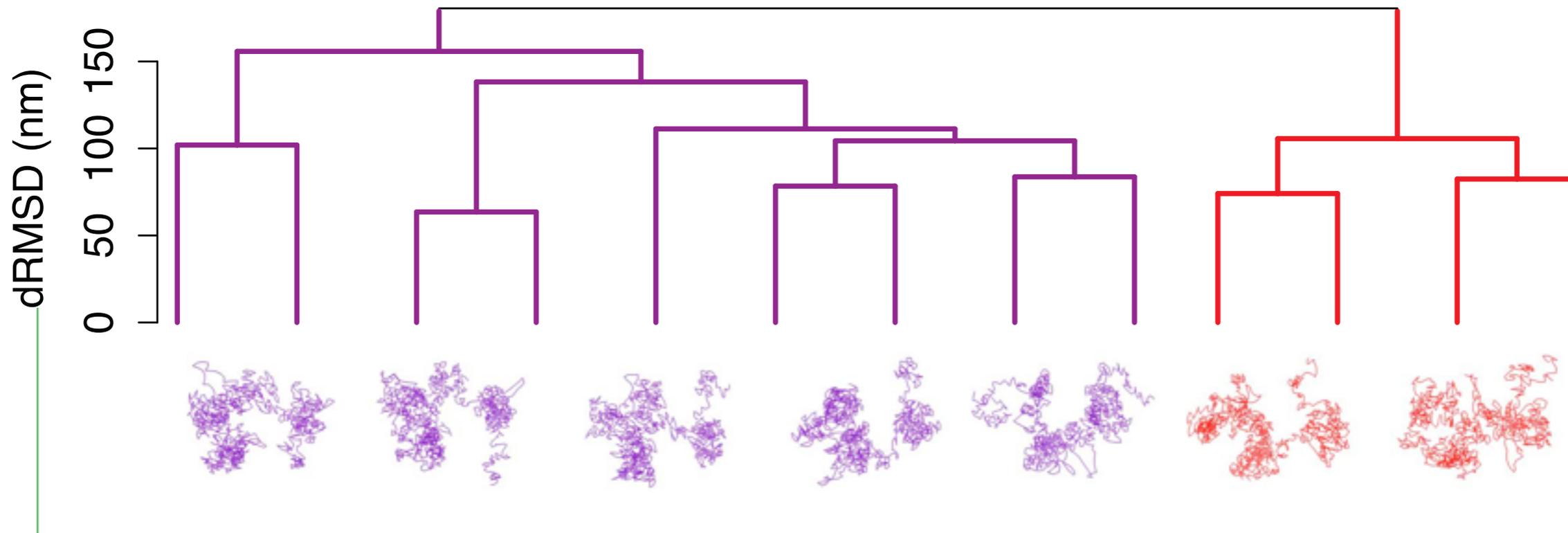
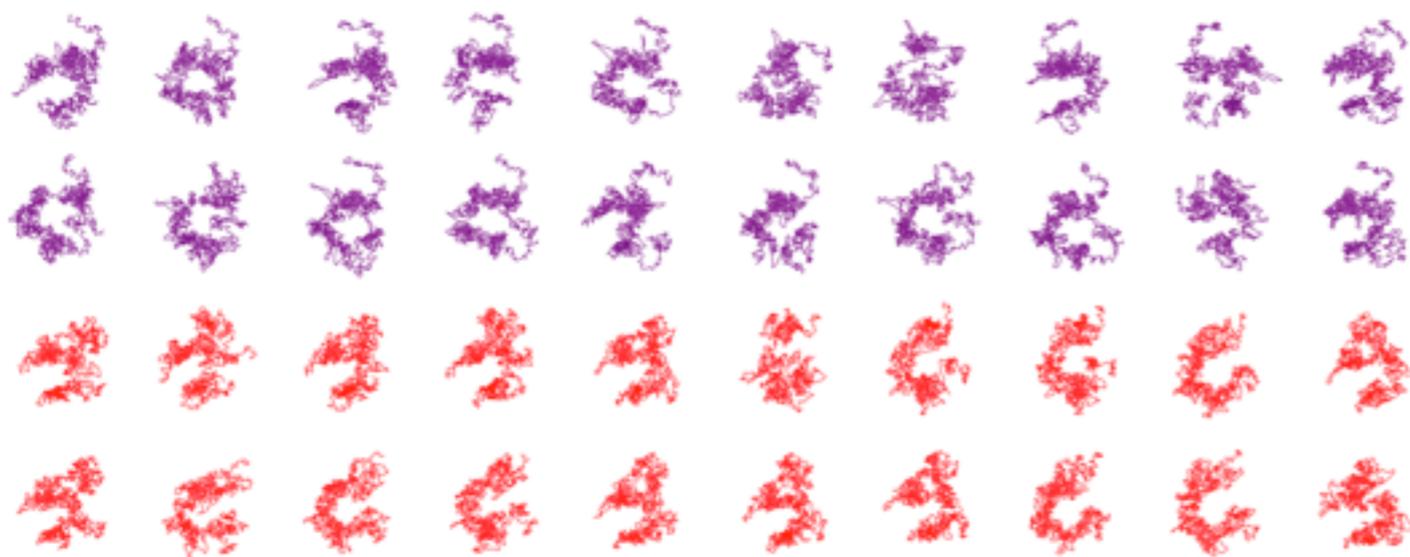
Topologically Associated Domains (TADs)



Optimization of the scoring function

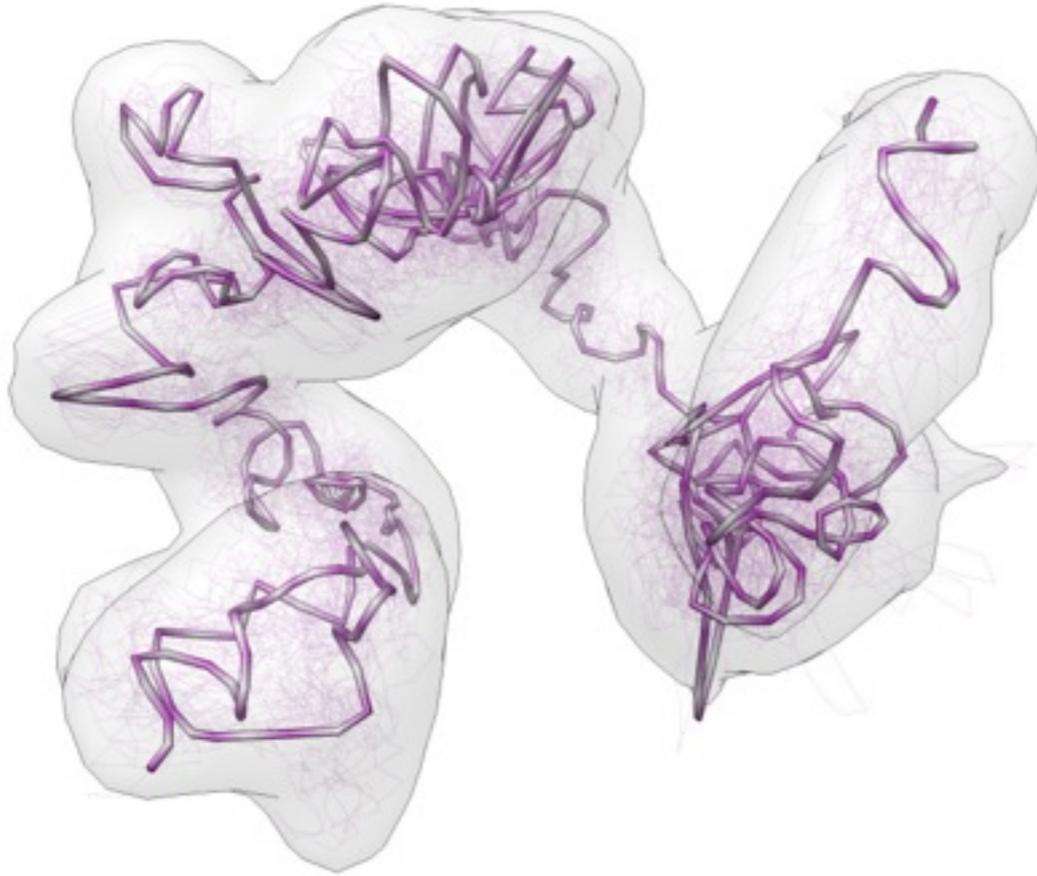


Clustering

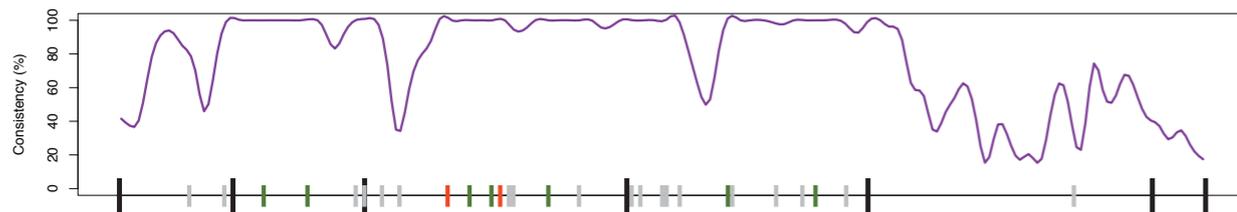


Clustering

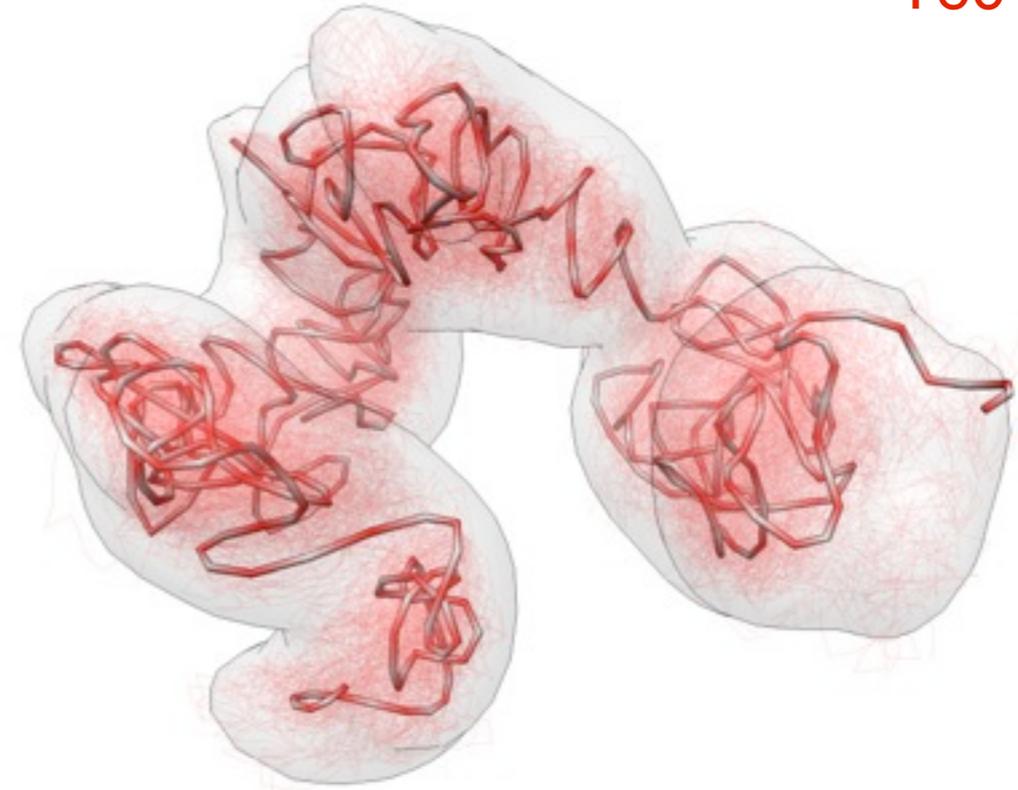
T0



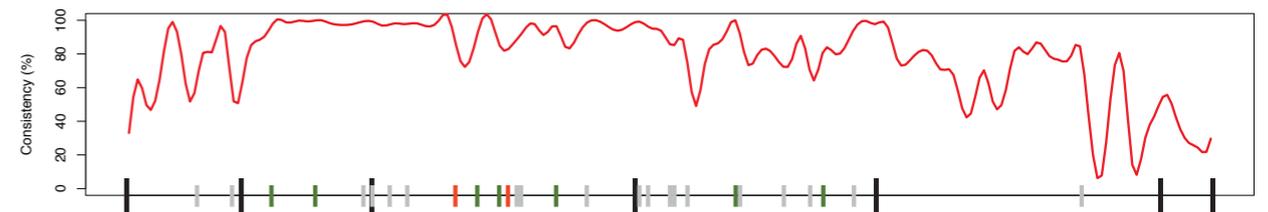
Cluster #3
13 models
MaxDist: ~1400nm



T60

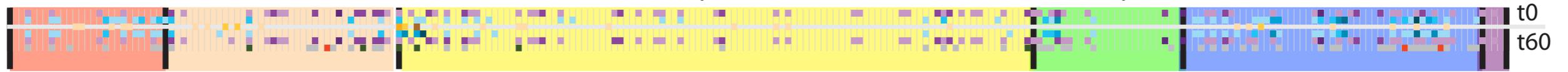


Cluster #1
42 models
MaxDist: ~1400nm

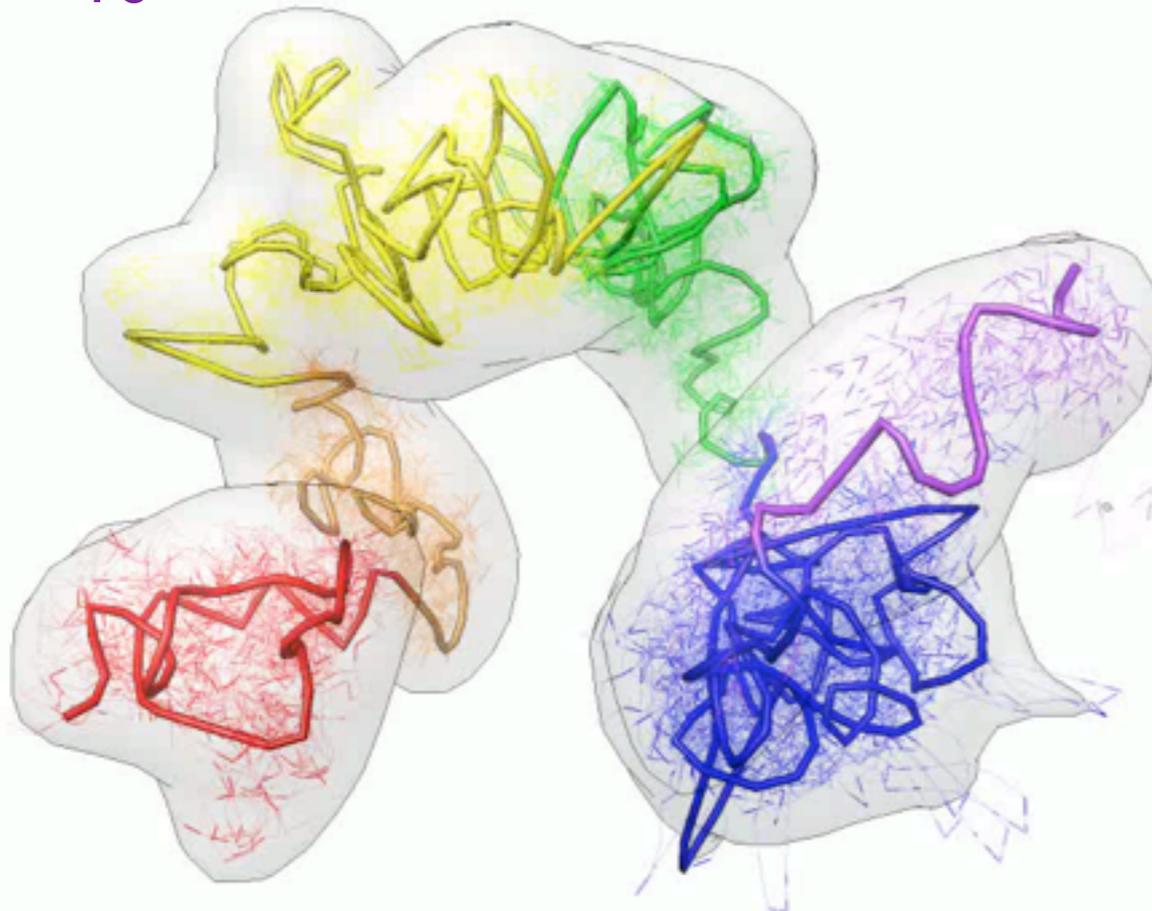


Structural TADs

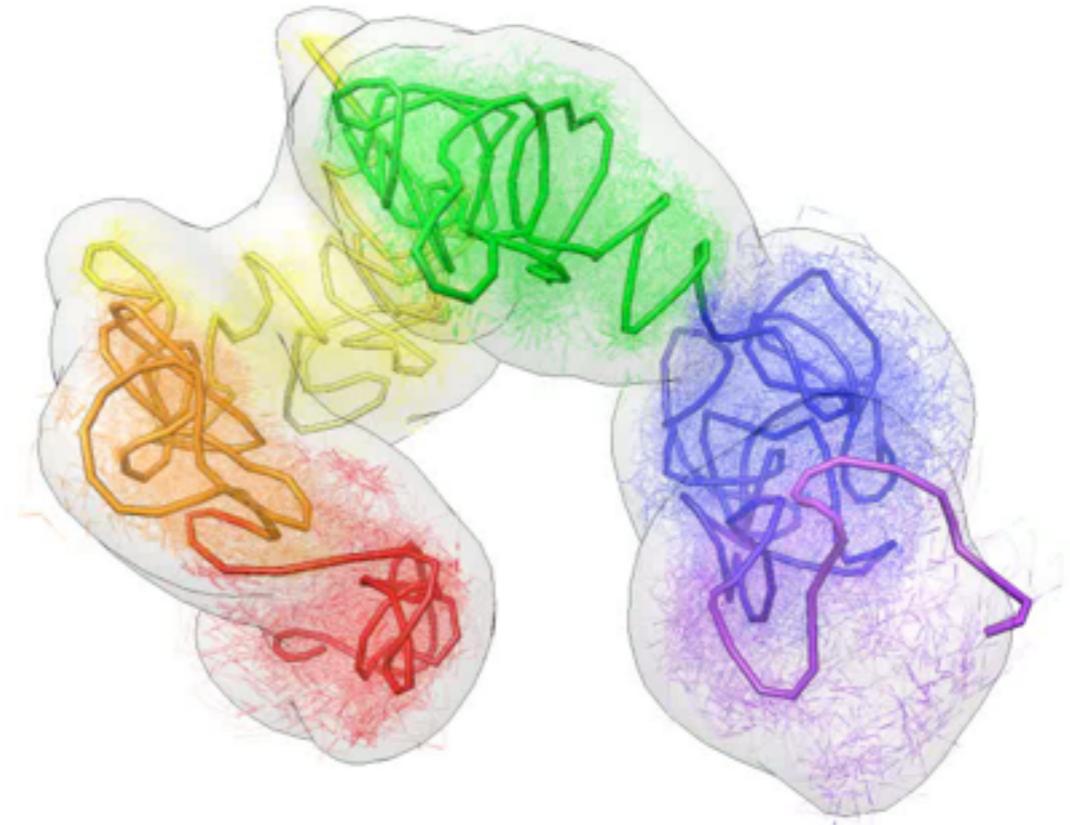
Human Chr2 (8,480,000 - 13,460,000)



T0

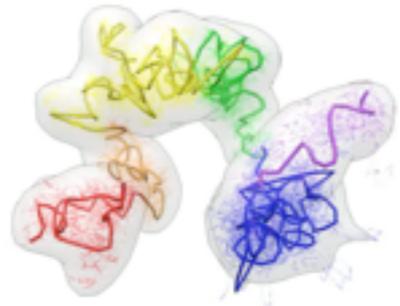


T60

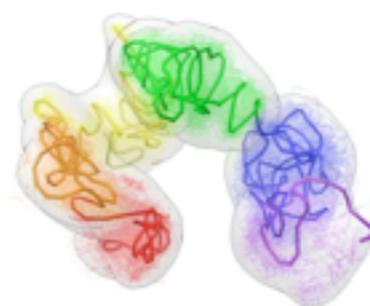


Structural expansion of TADs

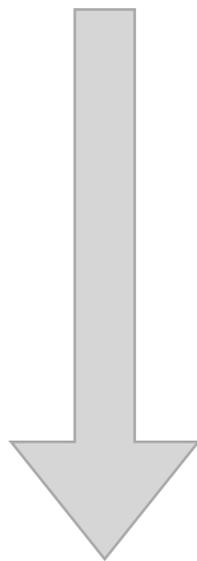
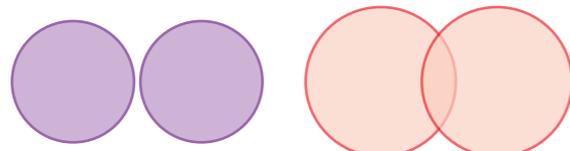
T0



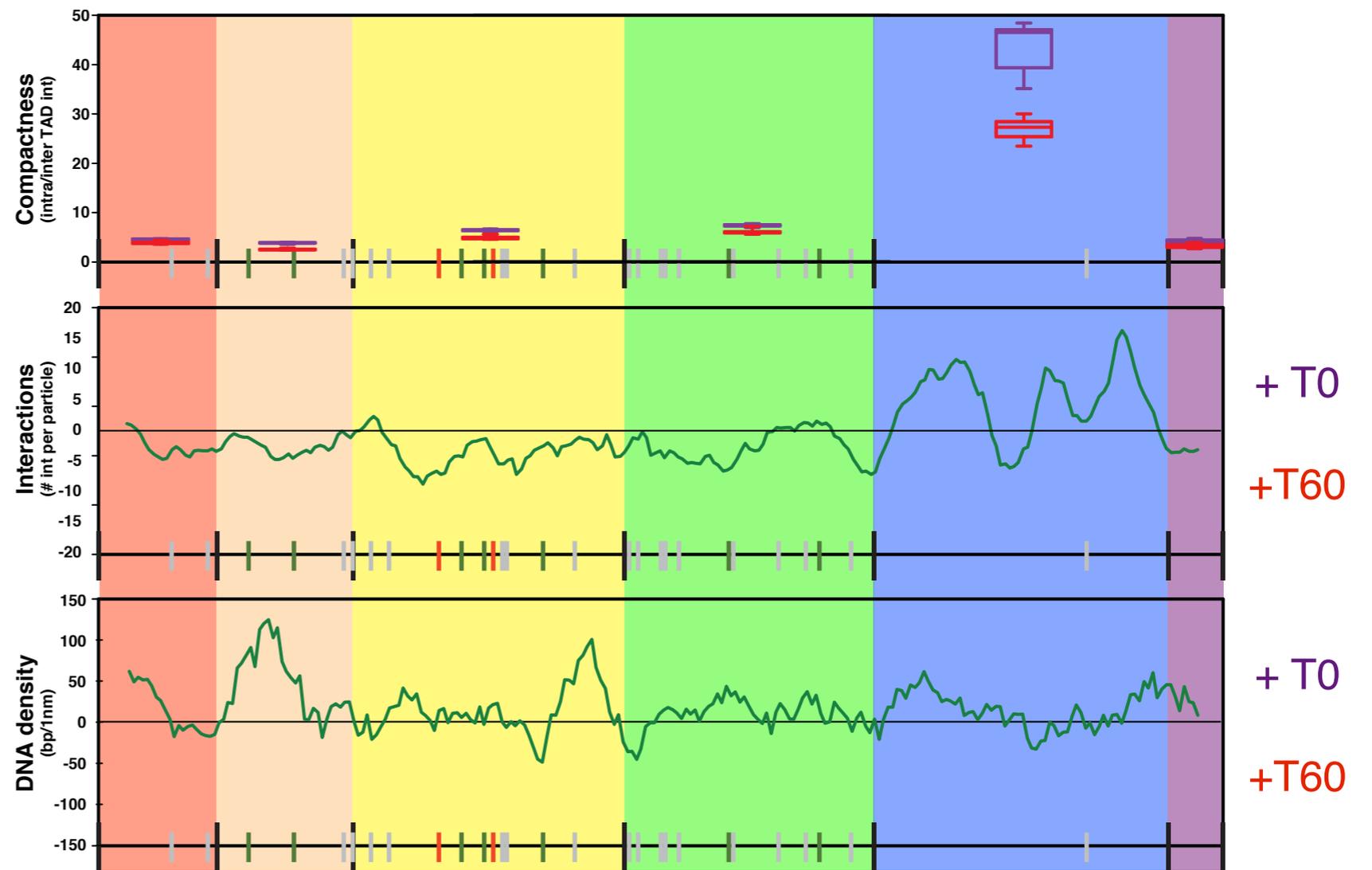
T60



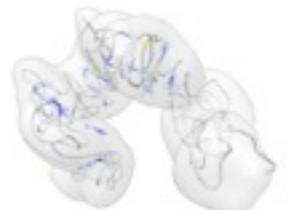
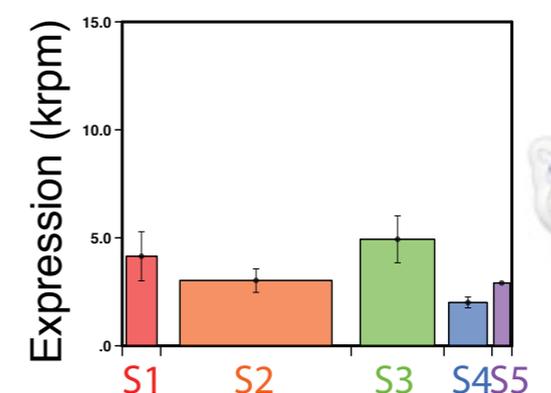
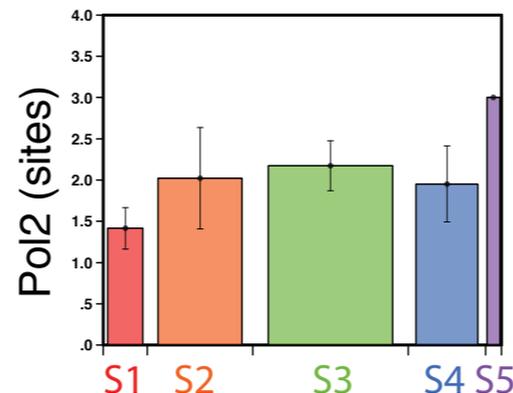
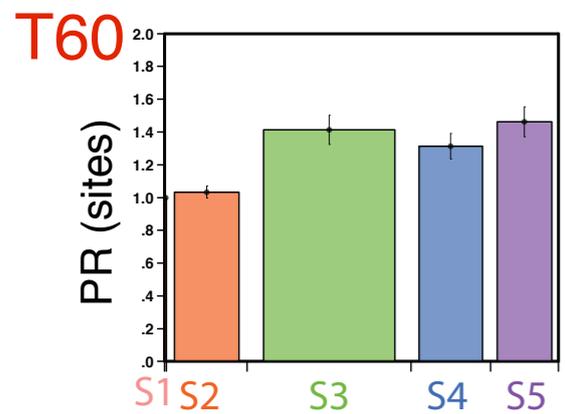
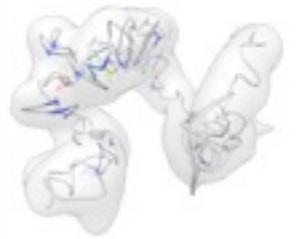
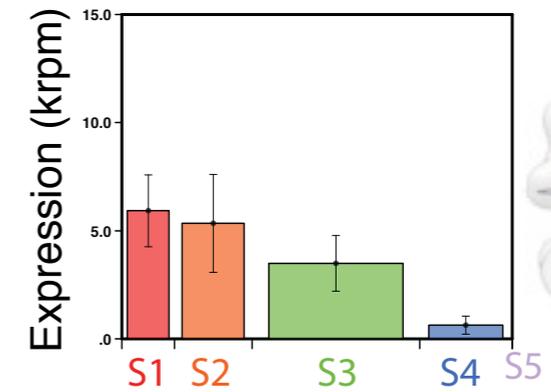
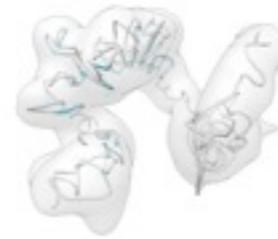
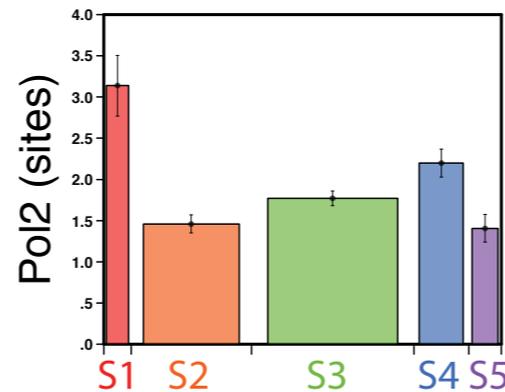
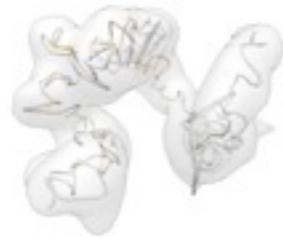
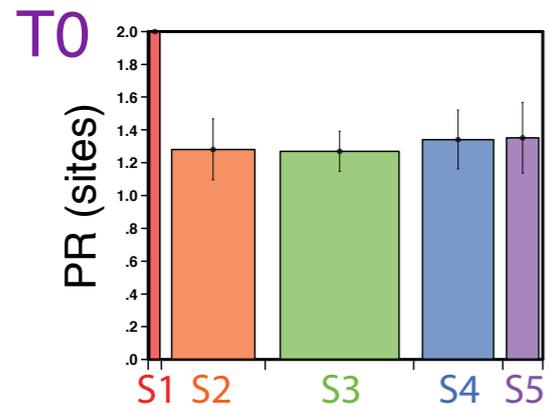
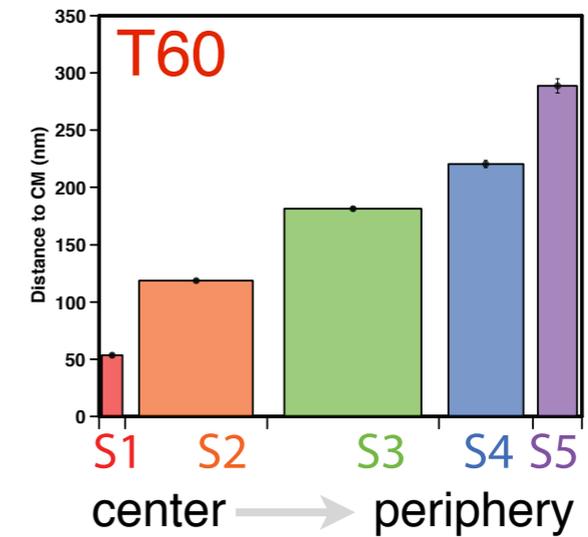
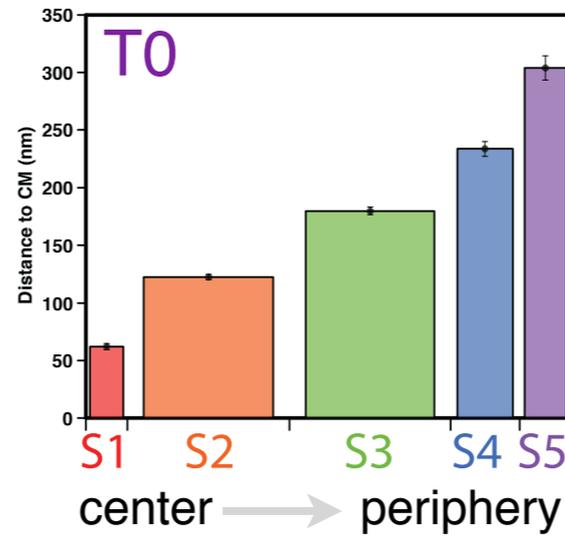
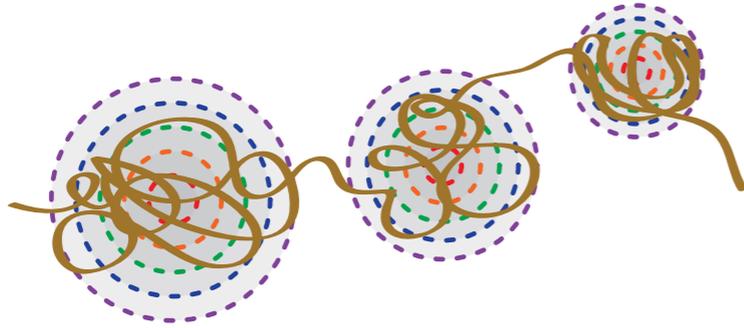
Global



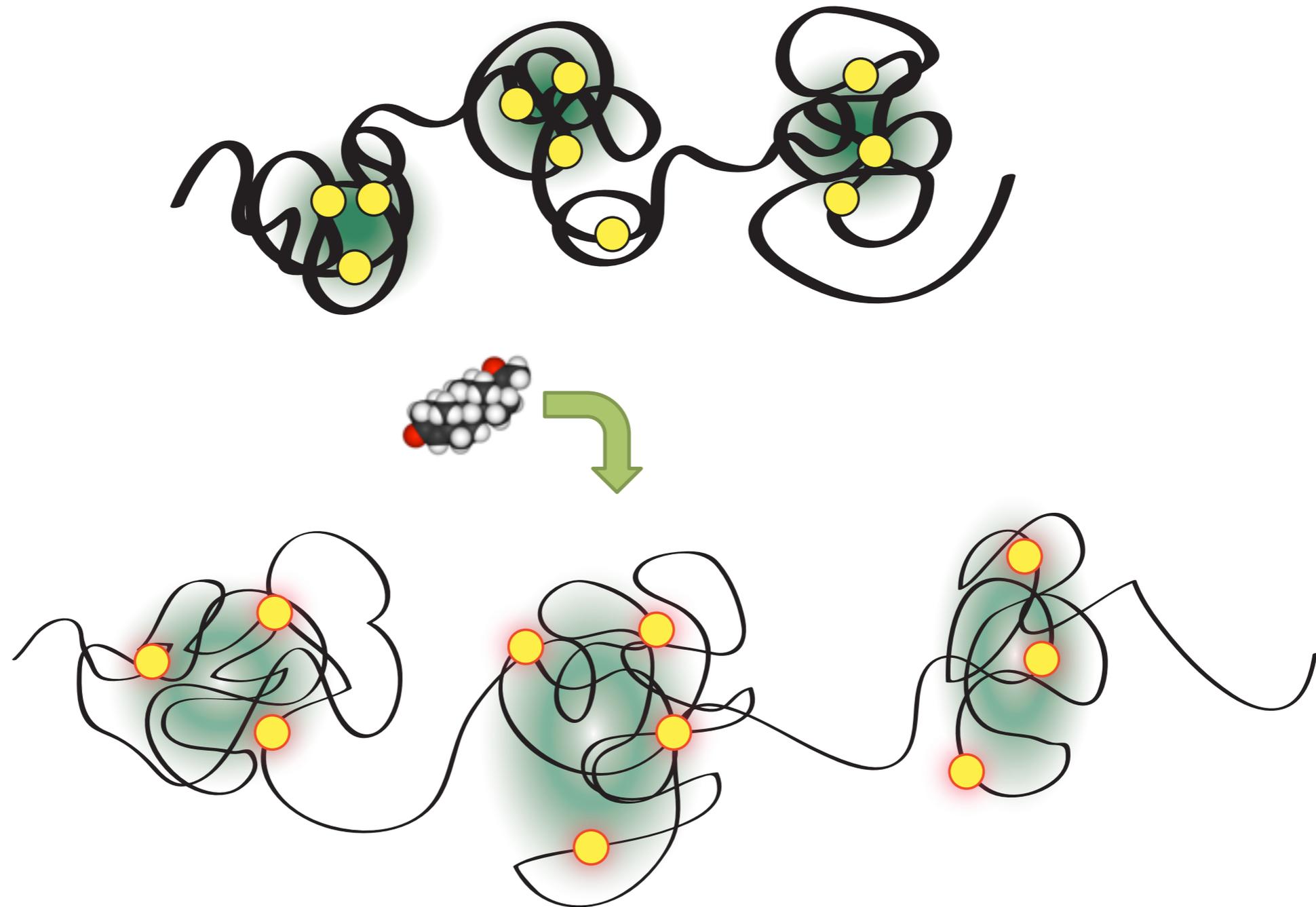
Local



Functional TADs



Model for TAD regulation



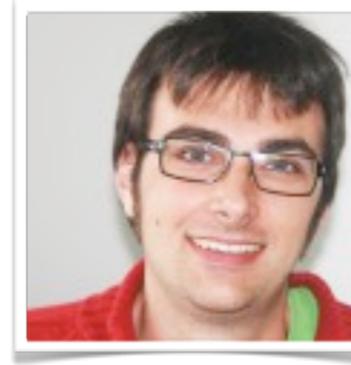
Acknowledgments



**Davide
Baù**



**François
le Dily**



**François
Serra**



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Chromatin and Gene Expression Group (CRG)



Guillaume Filion
Genome Architecture Group (CRG)

<http://marciuslab.org>
<http://integrativemodeling.org>
<http://cnag.cat> · <http://crg.cat>

