#### Does color have structure? Modeling 3D domains of the fly genome.

Marc A. Marti-Renom Genome Biology Group (CNAG) Structural Genomics Group (CRG)

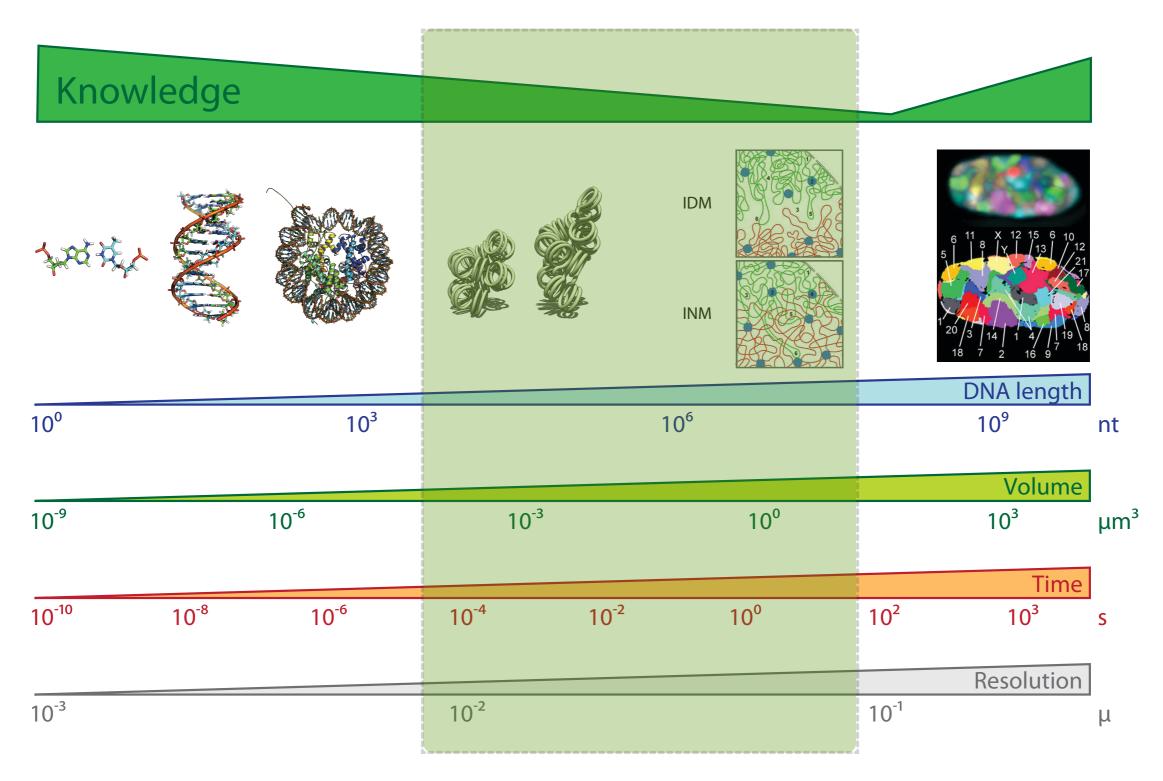






# **Resolution Gap**

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

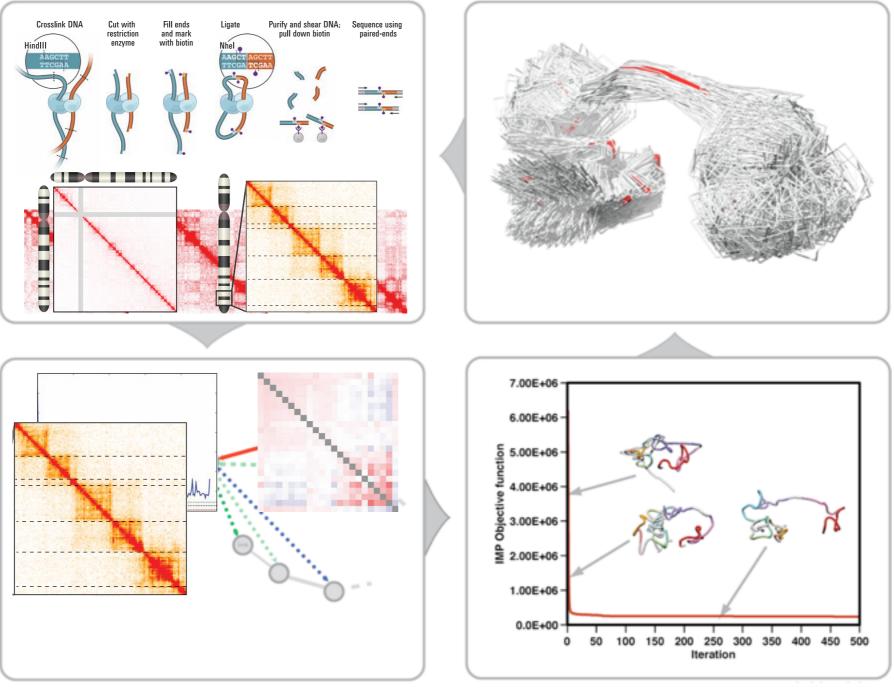




## Hybrid Method

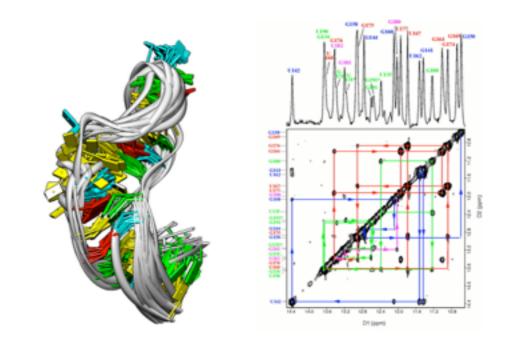
Baù, D. & Marti-Renom, M. A. Methods 58, 300–306 (2012).

**Experiments** 

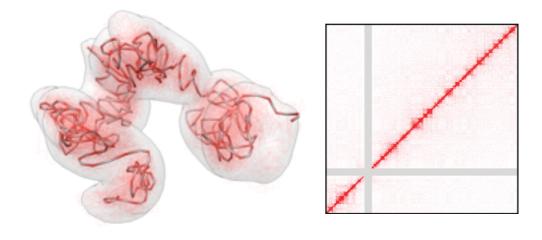


Computation





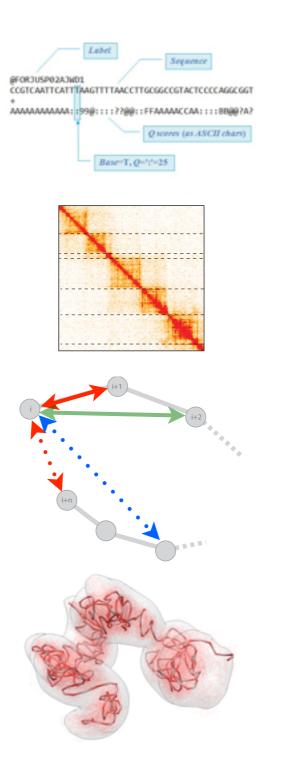
#### Biomolecular structure determination 2D-NOESY data



Chromosome structure determination 3C-based data







FastQ files to Maps

Map analysis

Model building

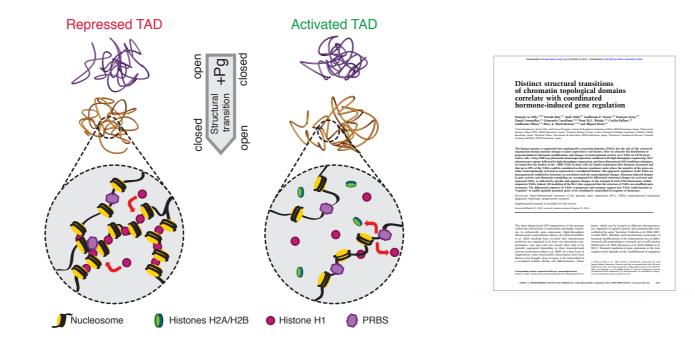
Model analysis



## **TADbit previous applications...**

Baù, D. et al. Nat Struct Mol Biol (2011). Umbarger, M. A. et al. Mol Cell (2011). Le Dily, F. et al. Genes & Dev (2014)

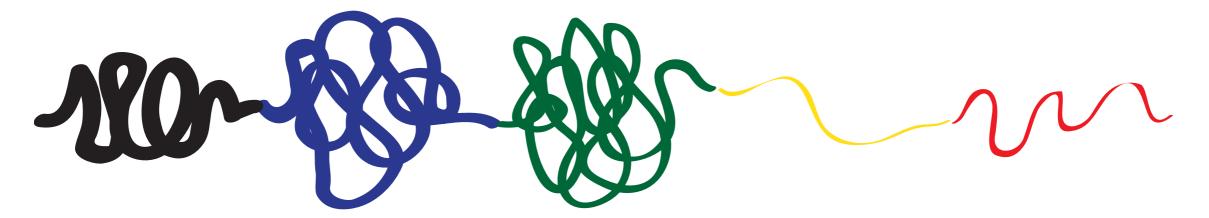






# Structuring the COLORs of chromatin

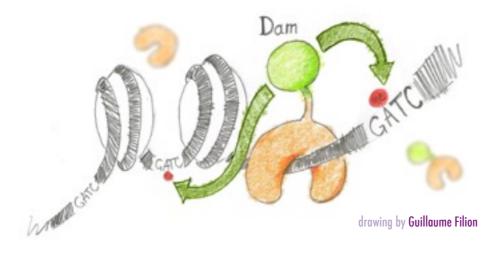


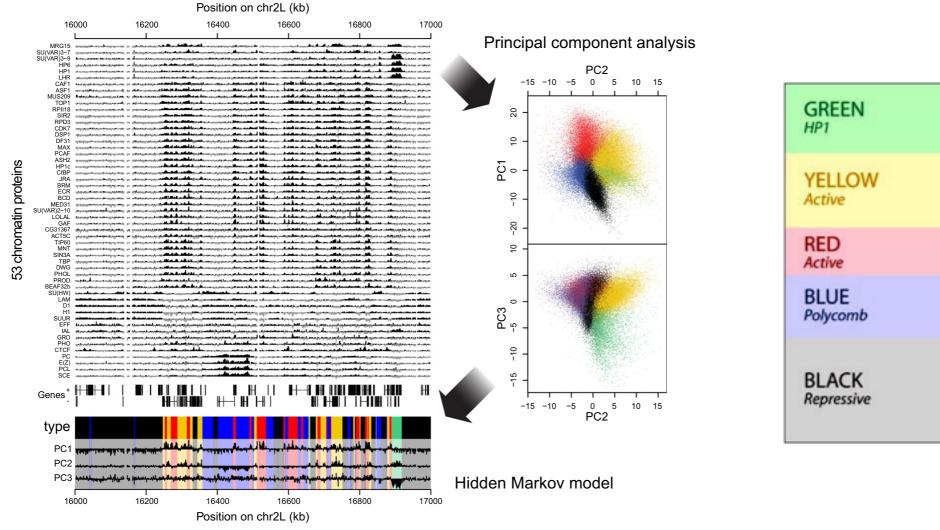




## Fly Chromatin COLORs

Filion et al. (2010). Cell, 143(2), 212-224.







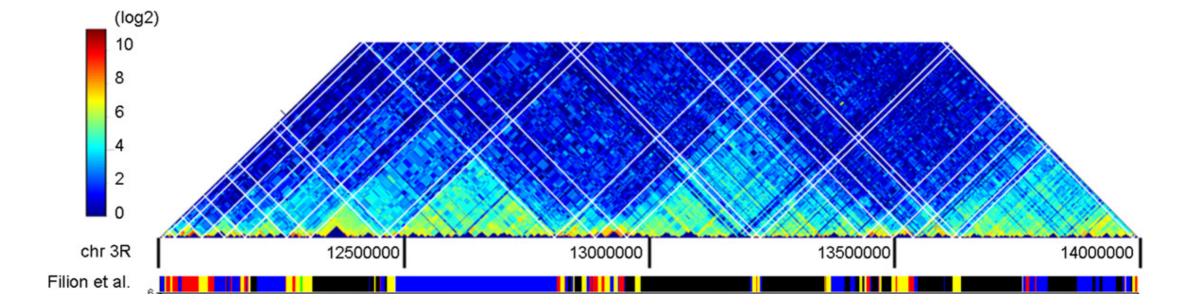
chromatin

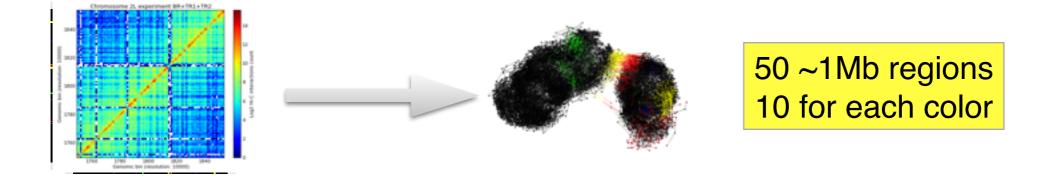
Nucleus

proteins

### Functional COLORs

Hou et al. (2012). Molecular Cell, 48(3), 471–484.

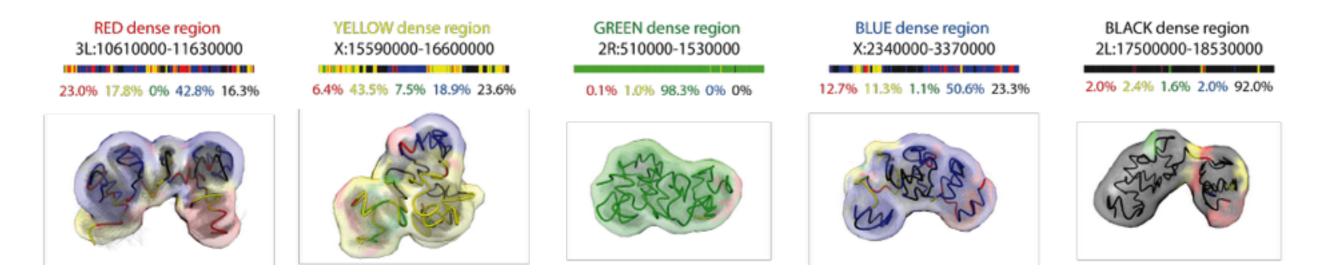




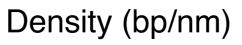


## Structural properties

50 1Mb regions. 10 enriched for each color.

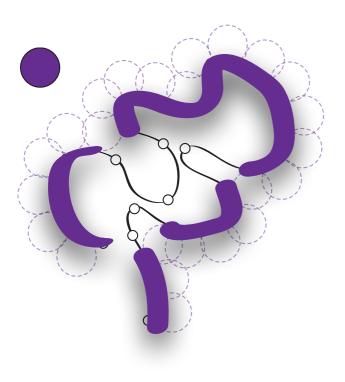


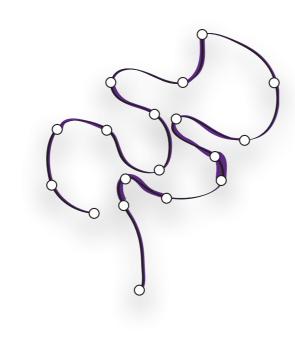
Accessibility (%)

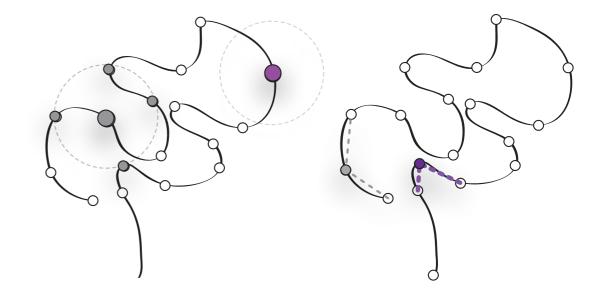


Interactions

Angle

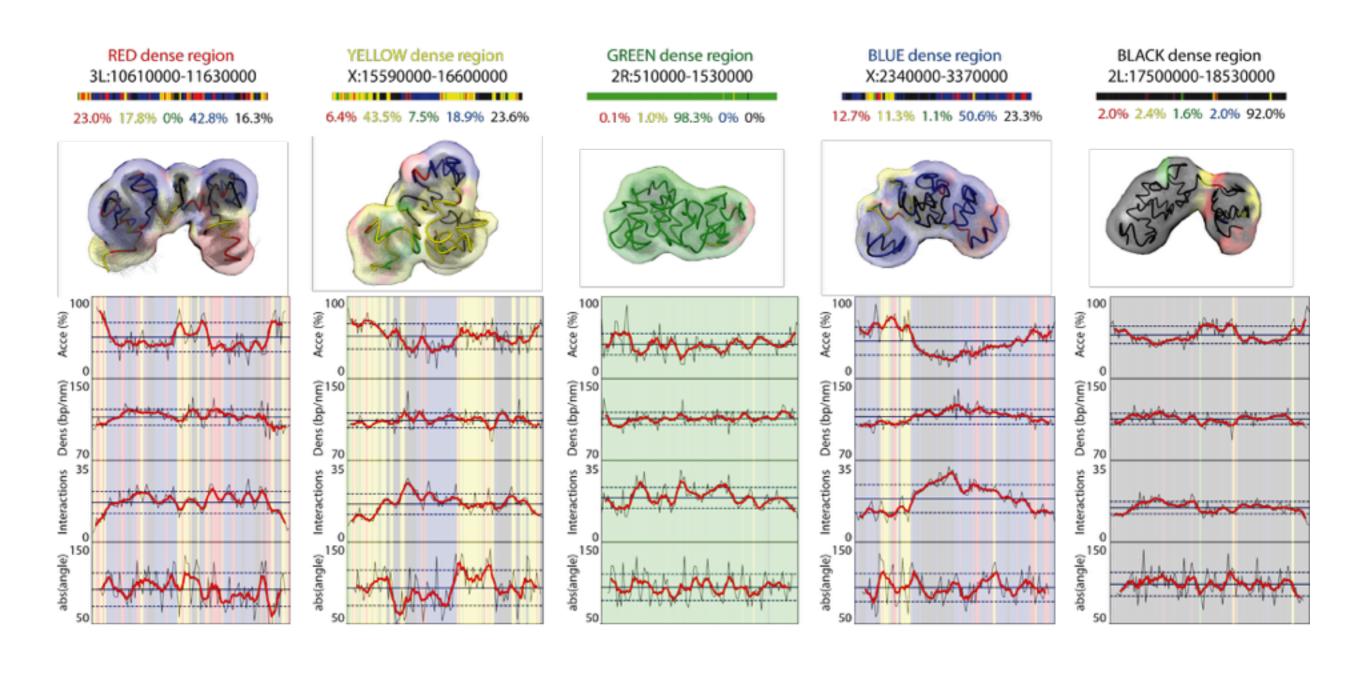






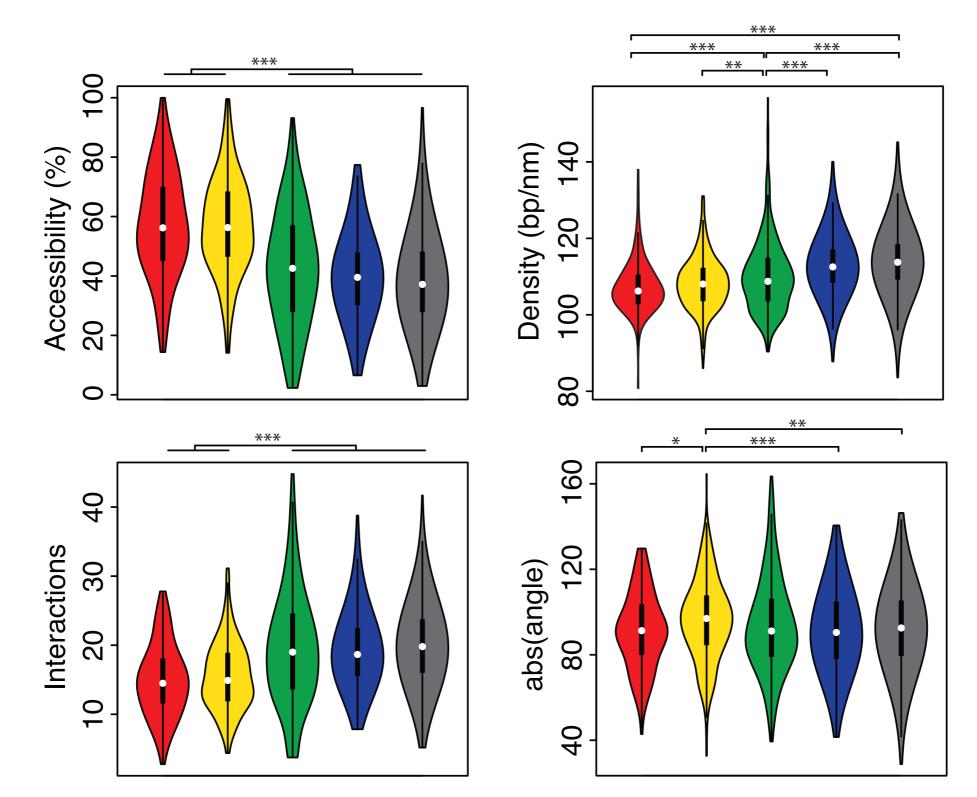


## Structural COLORs



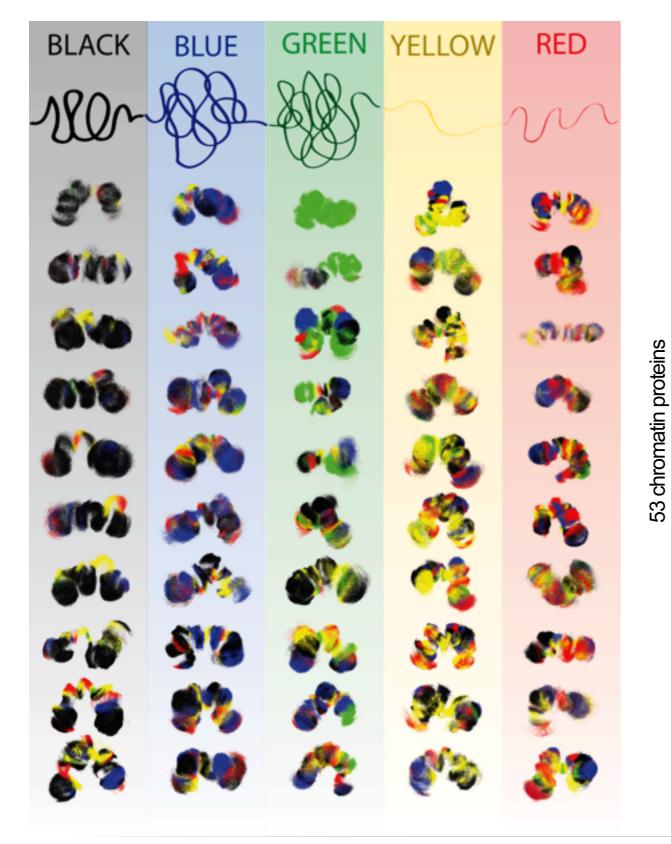


#### Structural COLORs





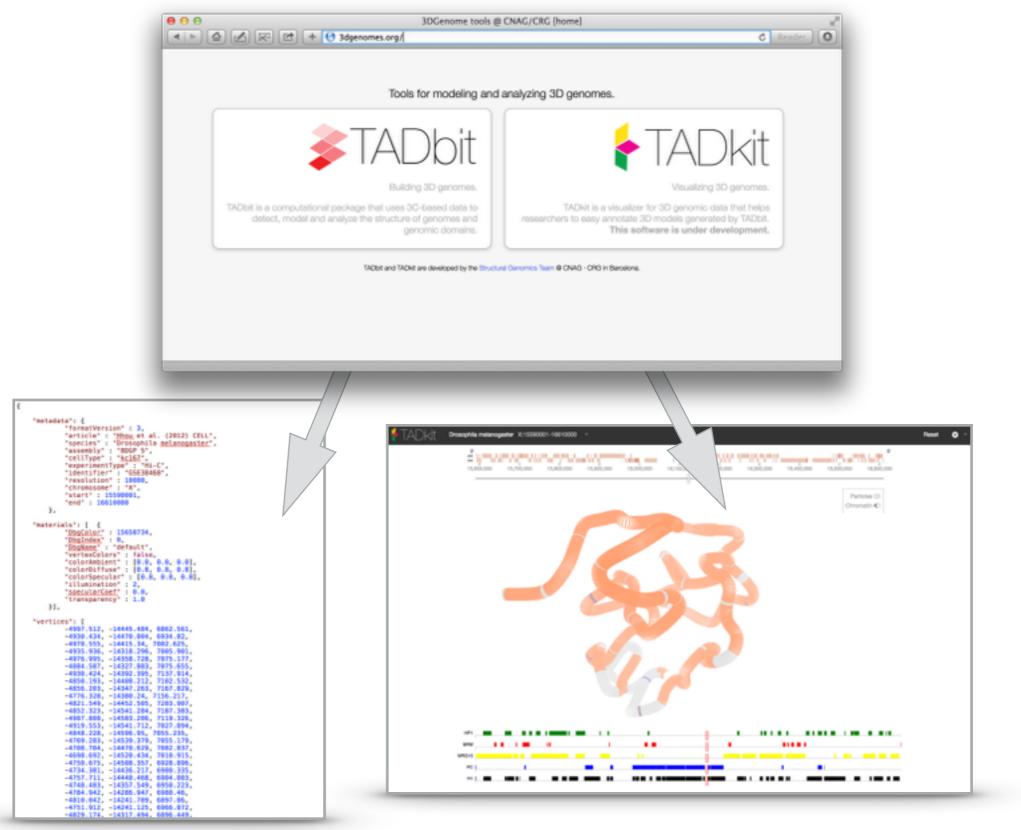
### Structural COLORs



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#### http://3DGenomes.org





# Shameless promotion...



March 24th, Boston



November 23th-27th, Lisbon



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