

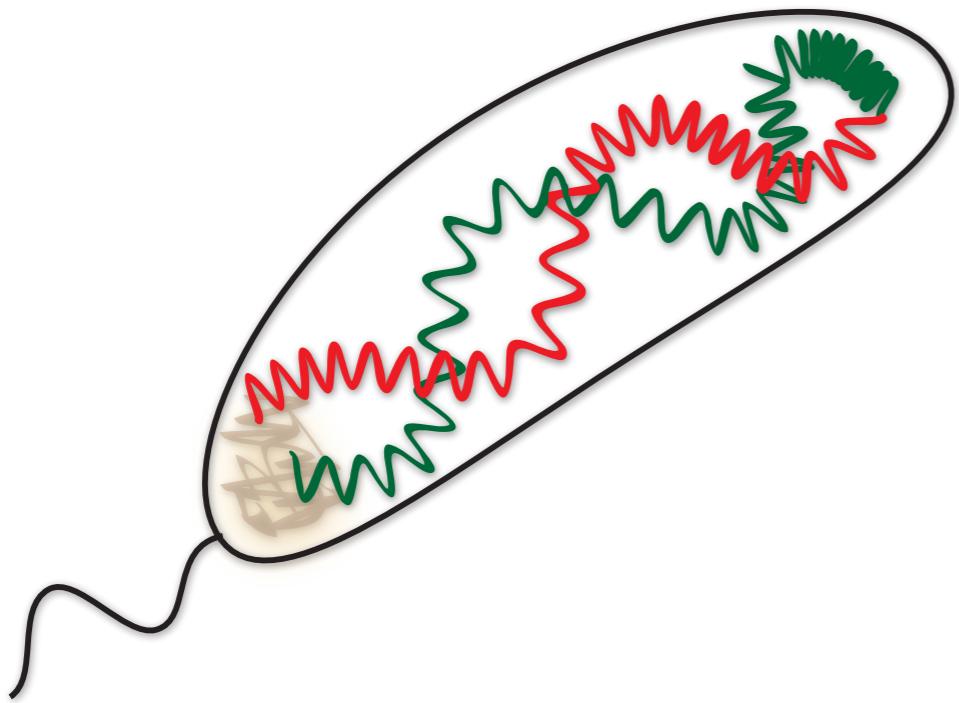
Biological Applications (II)

Caulobacter crescentus

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Structural Genomics Group (CNAG-CRG)



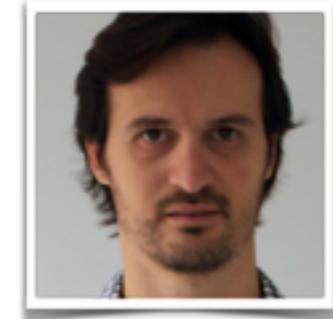
Caulobacter crescentus genome



Mark Umbarger
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Harvard



Esteban Toro
PhD fellow
Stanford

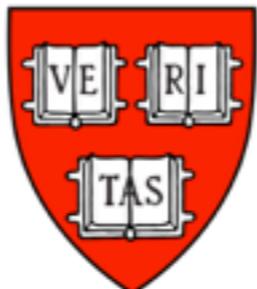


Davide Baù
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Program in Gene Function and Expression
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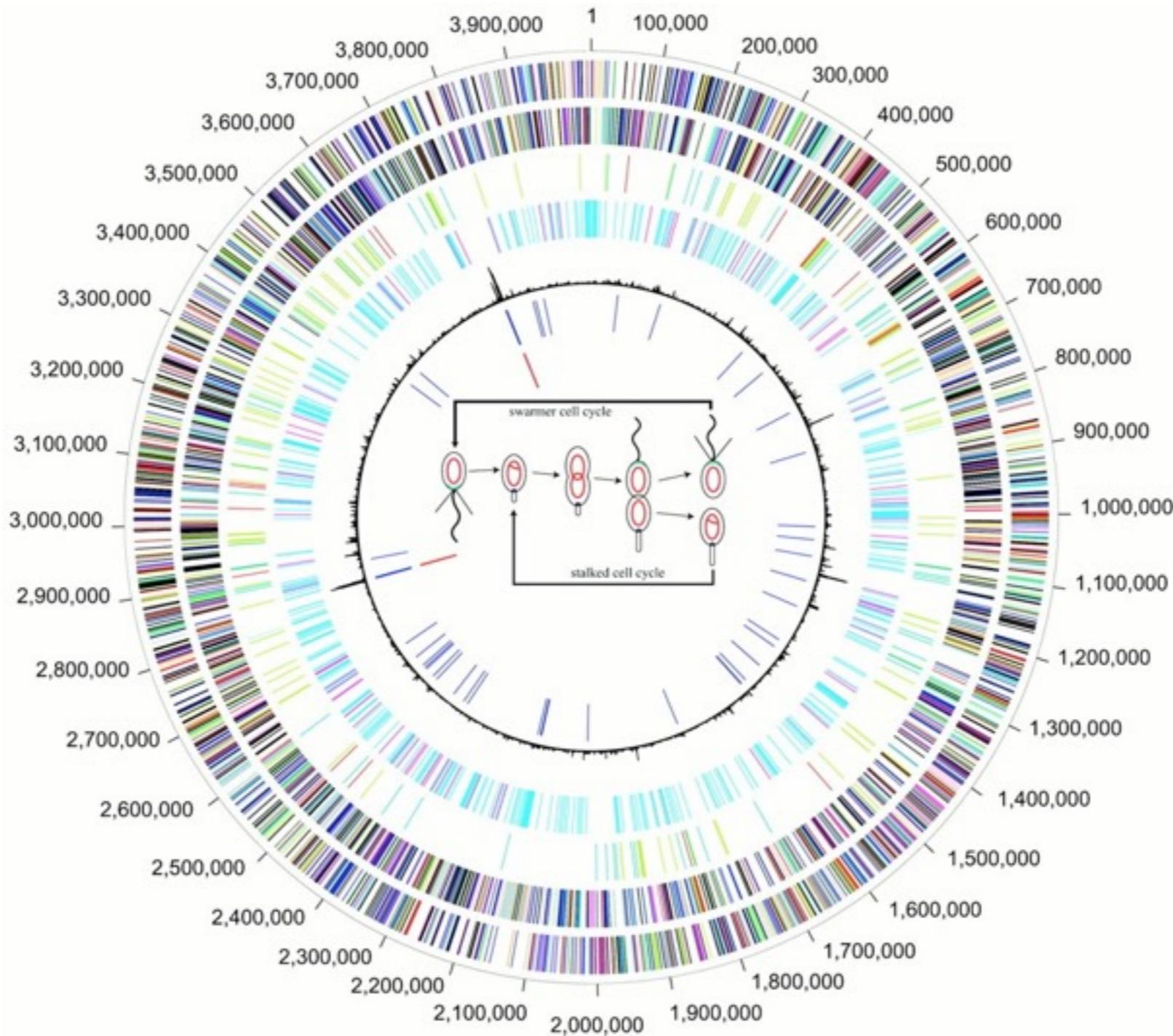


Lucy Shapiro

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The 3D architecture of *Caulobacter Crescentus*

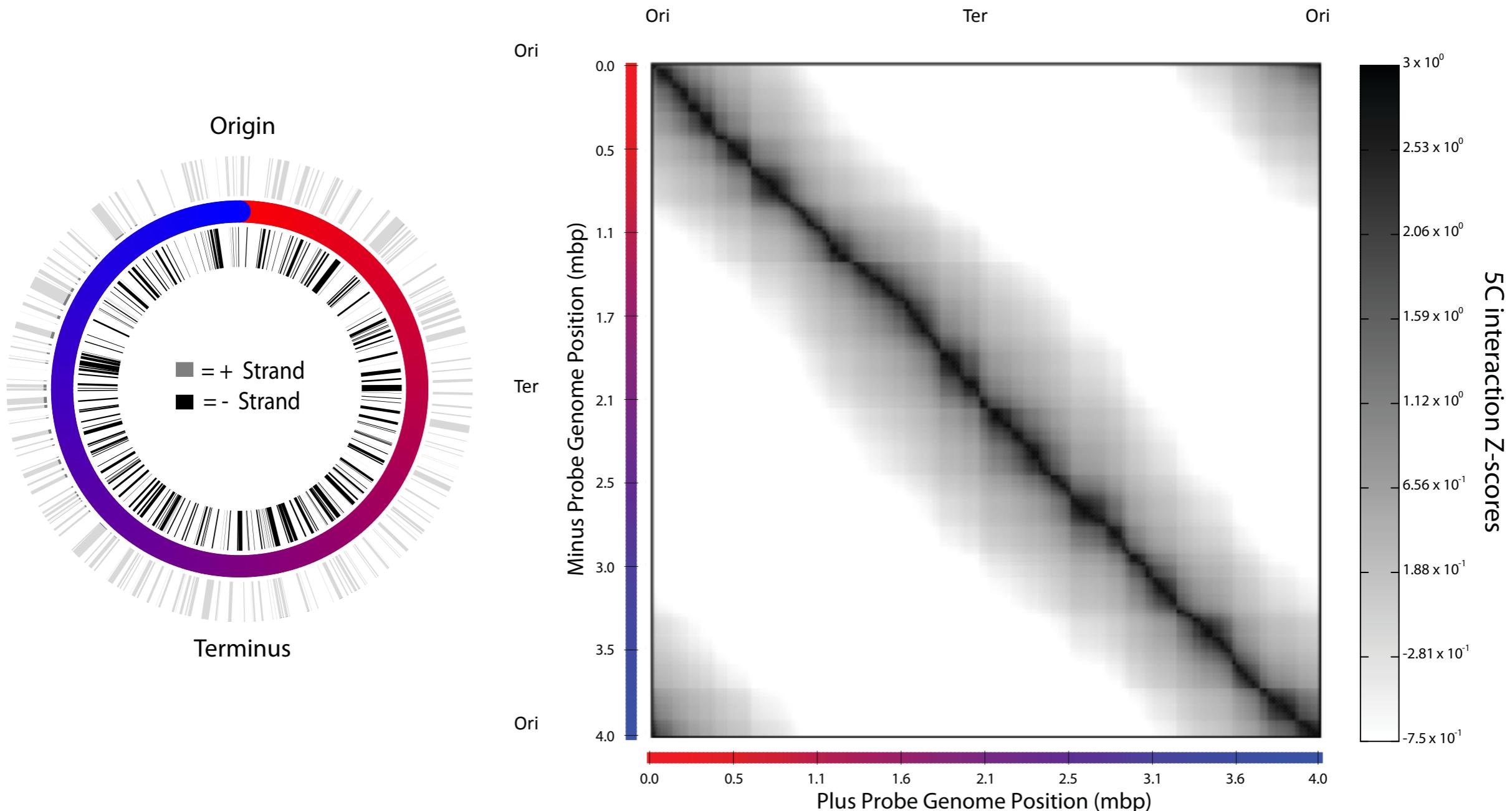
4,016,942 bp & 3,767 genes



Nierman W C et al. PNAS 2001 98:4136-4141

The 3D architecture of *Caulobacter Crescentus*

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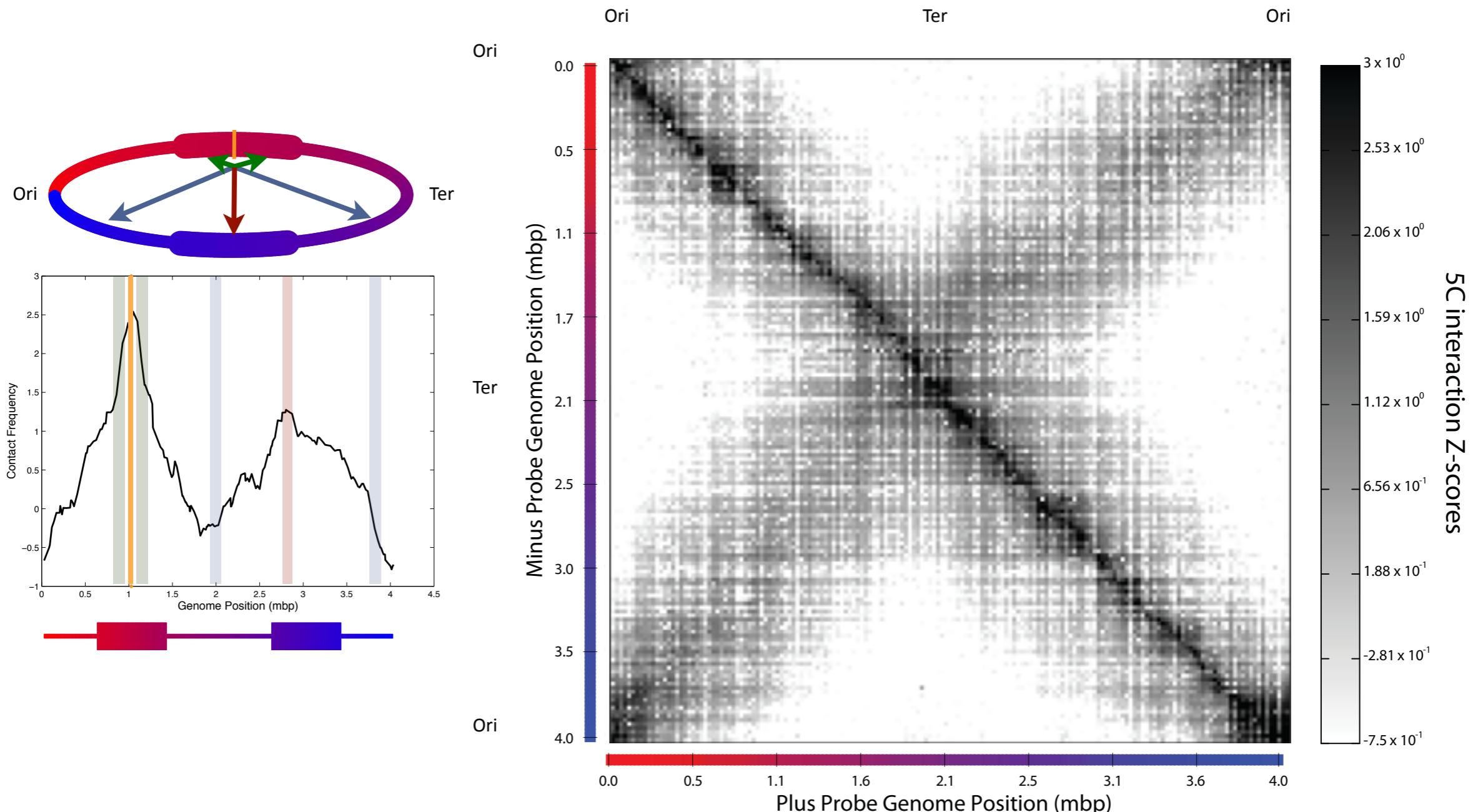


169 5C primers on + strand
170 5C primers on – strand
28,730 chromatin interactions

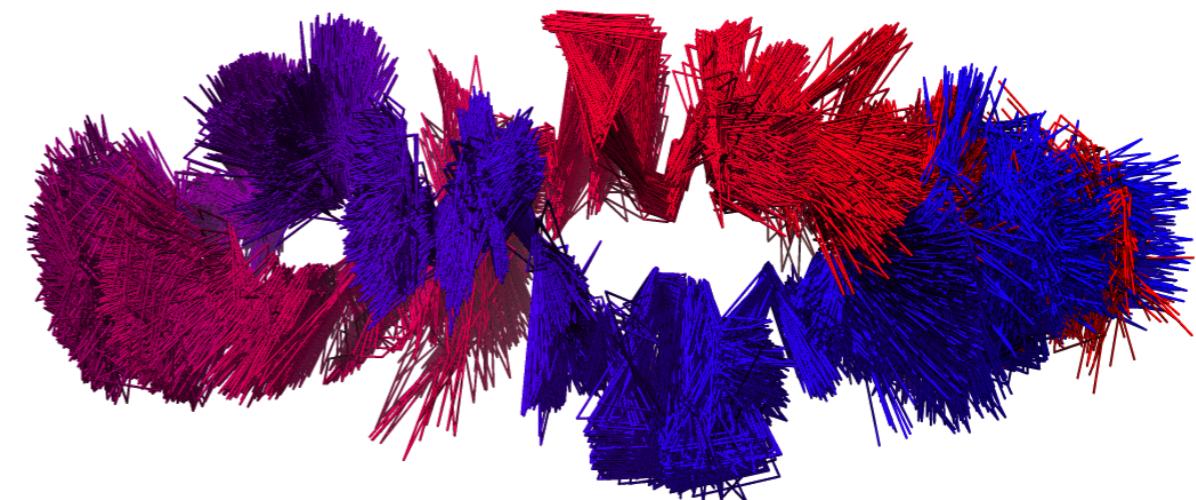
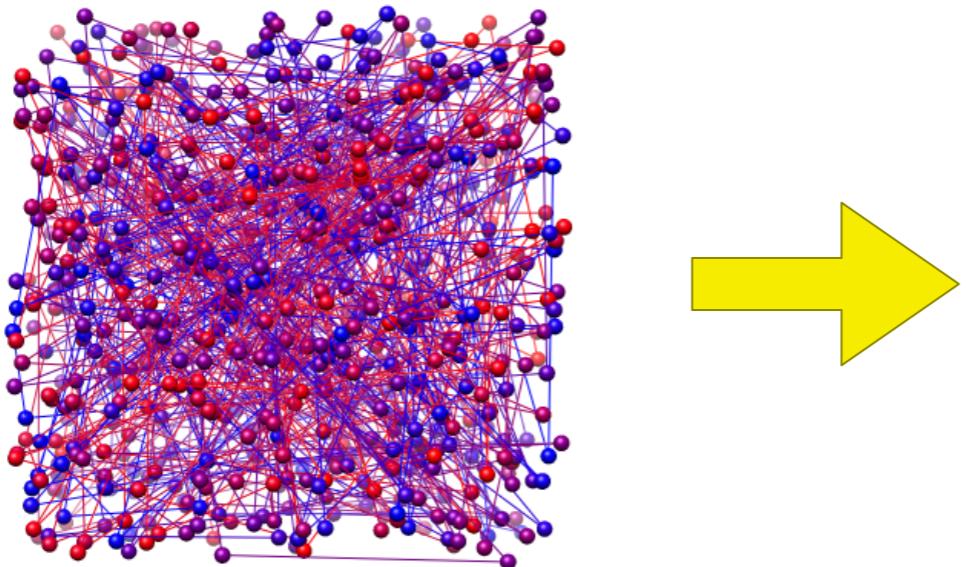
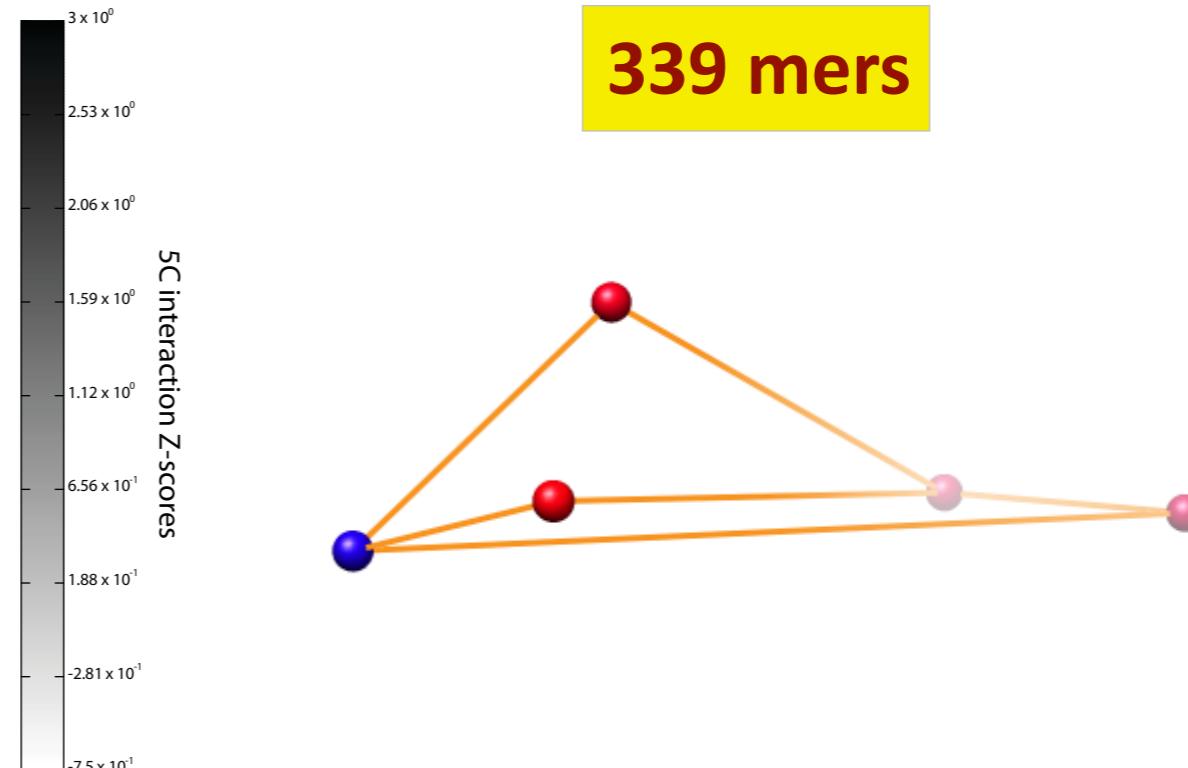
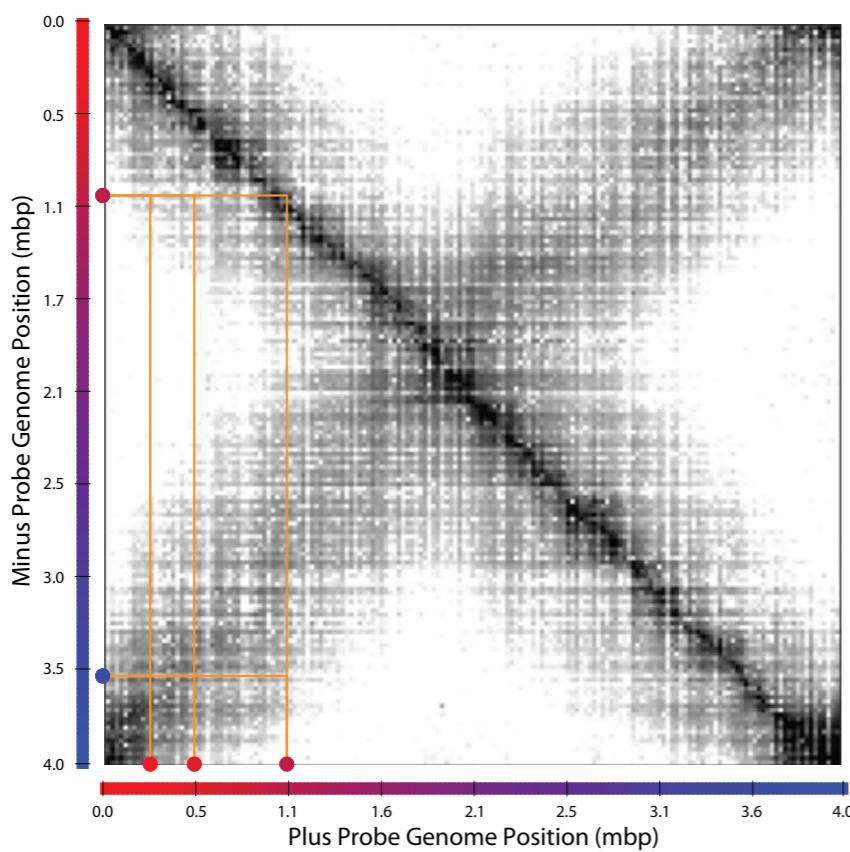
~13Kb

5C interaction matrix

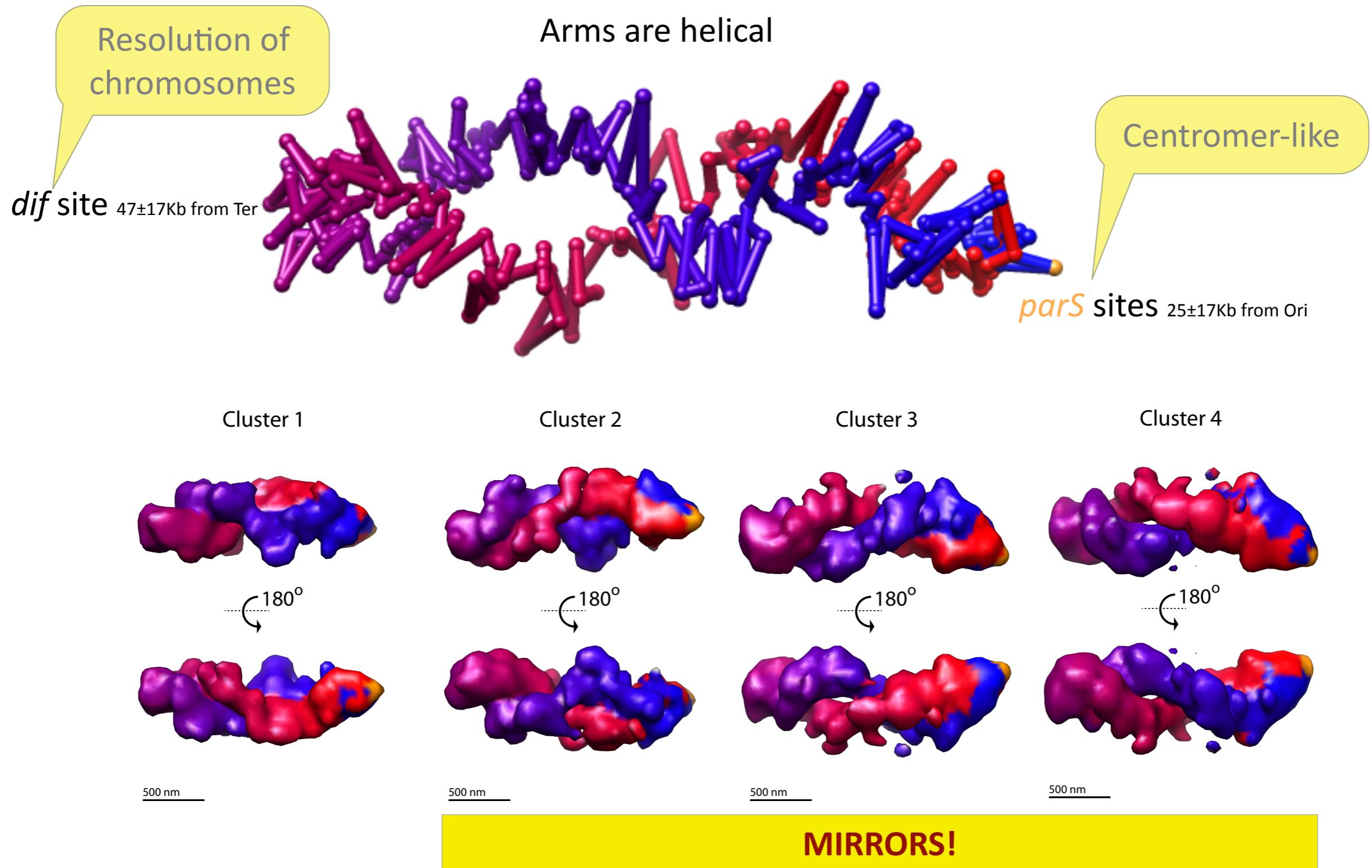
ELLIPSOID for *Caulobacter crescentus*



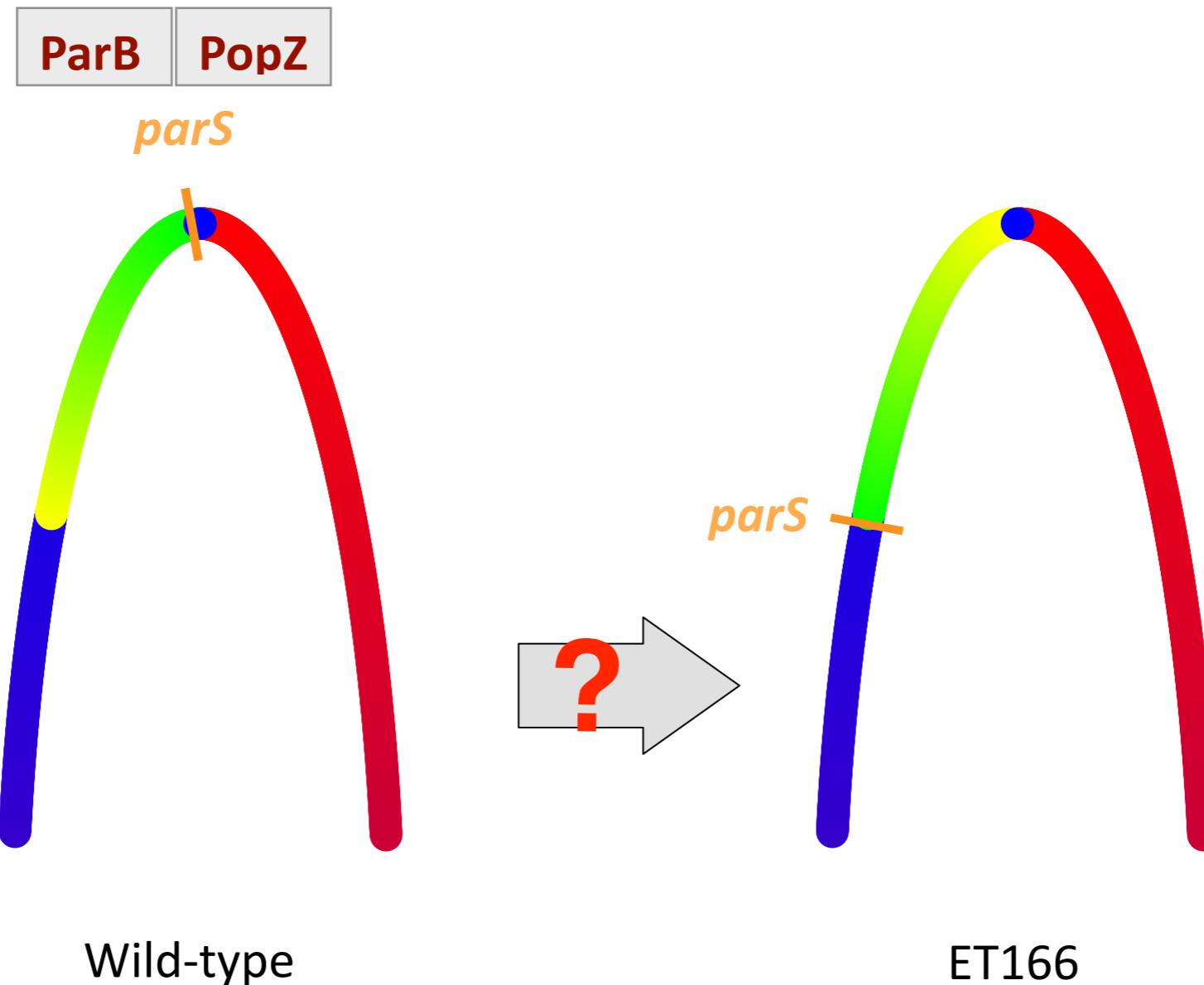
3D model building with the 5C + IMP approach



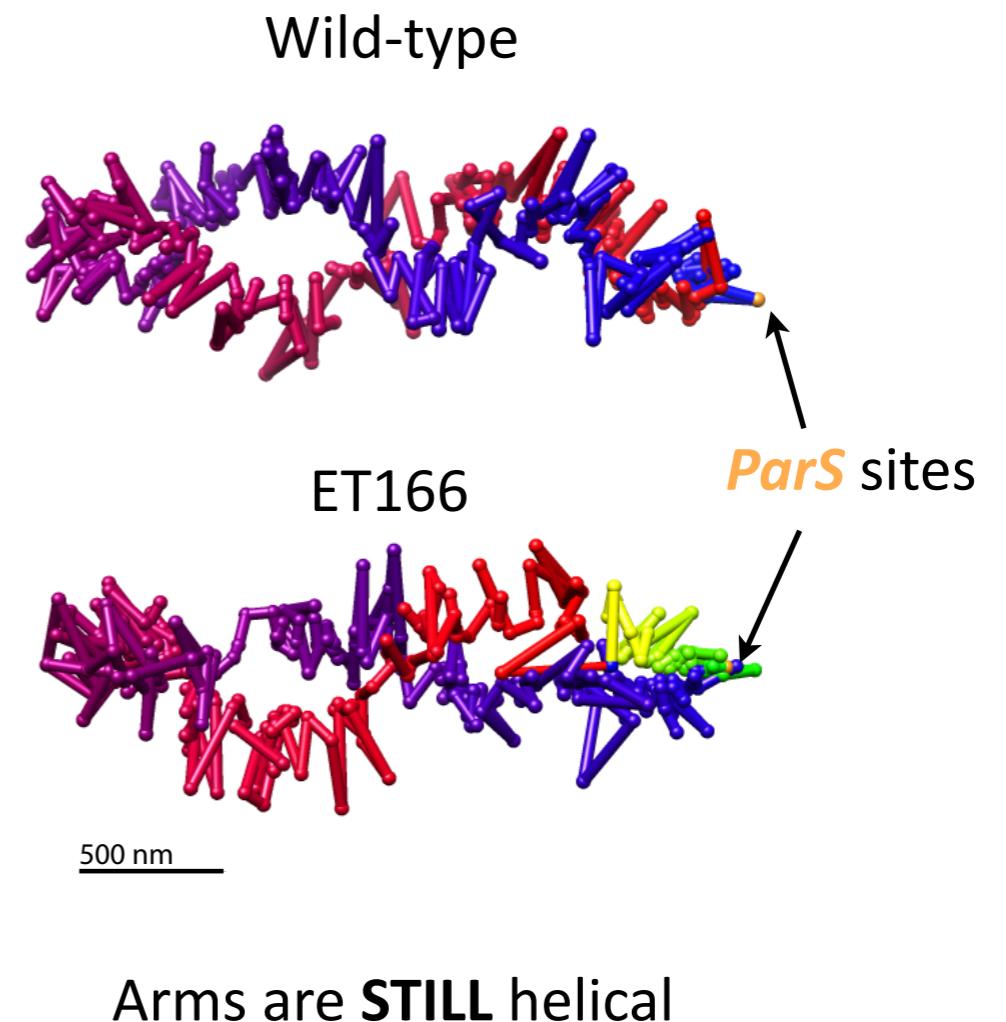
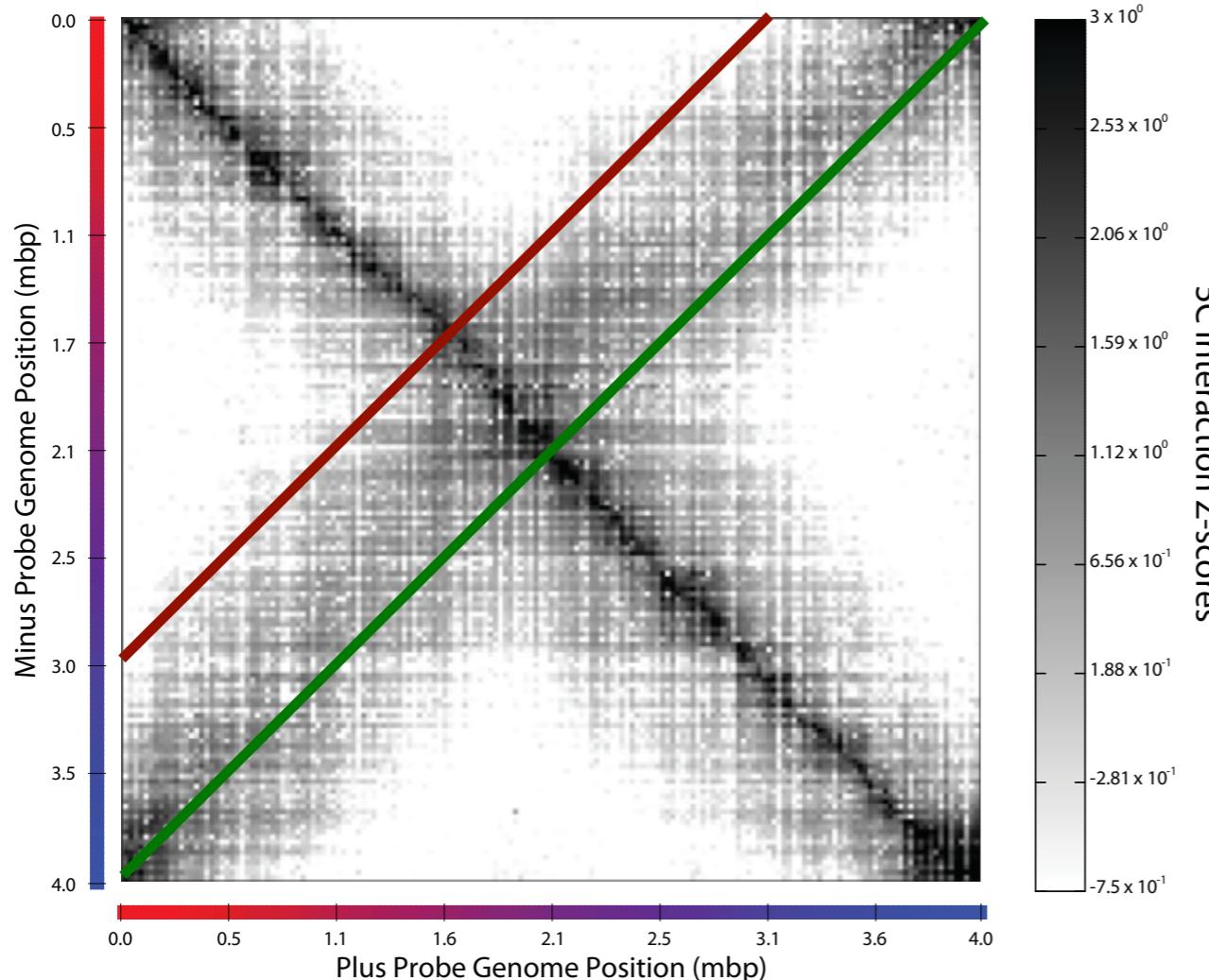
Genome organization in *Caulobacter crescentus*



Moving the *parS* sites 400 Kb away from Ori

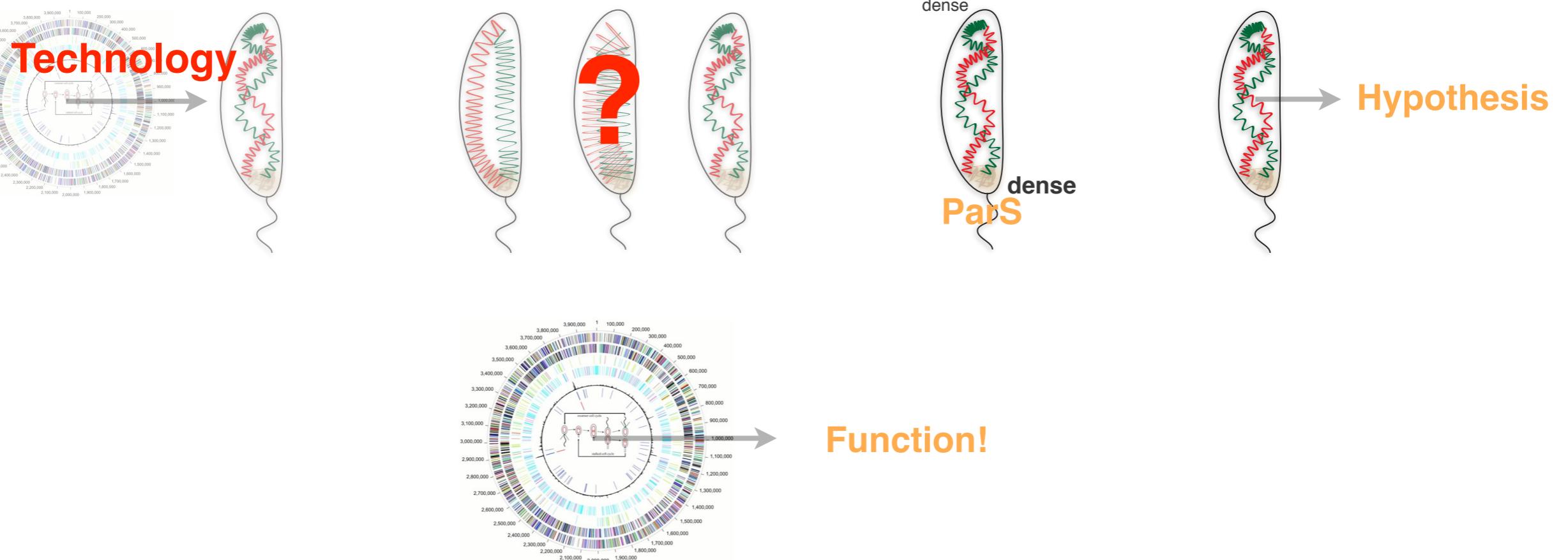
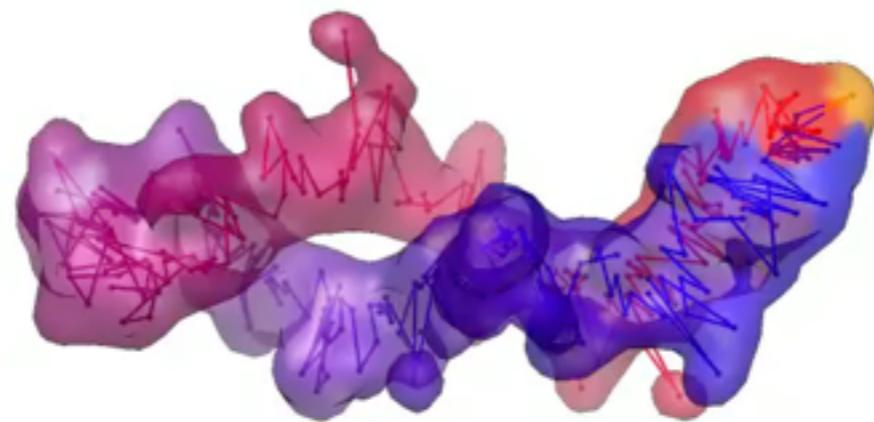


Moving the *parS* sites results in whole genome rotation!



From Sequence to Function

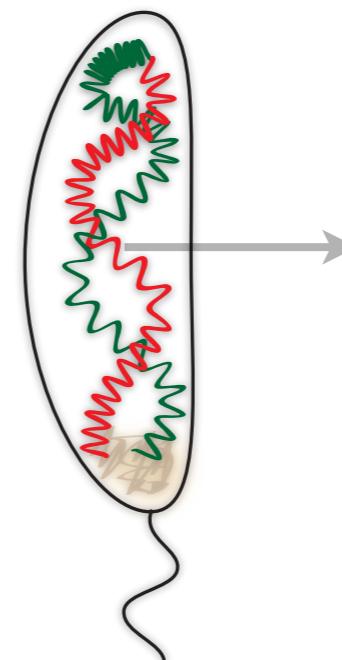
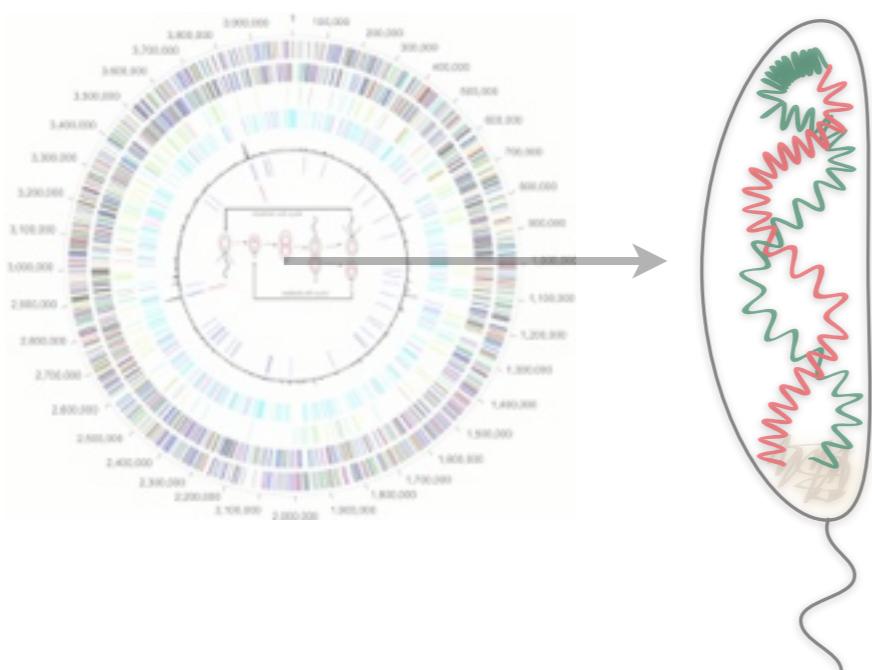
Genome architecture in *Caulobacter*



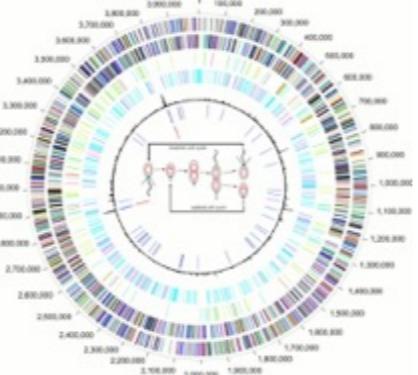
From Sequence to Function

5C + IMP

Technology



Hypothesis



Function!

D. Baù and M.A. Martí-Renom Chromosome Res (2011) 19:25-35.

Bacteria has also TADs (CIDs)

Le, T. B. K., Imakaev, M. V., Mirny, L. A., & Laub, M. T. (2013). High-Resolution Mapping of the Spatial Organization of a Bacterial Chromosome. *Science* (New York, NY), 1242059

