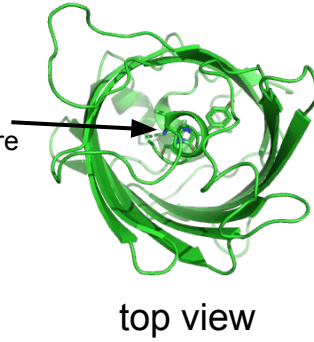
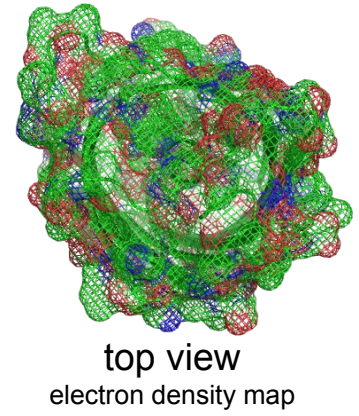
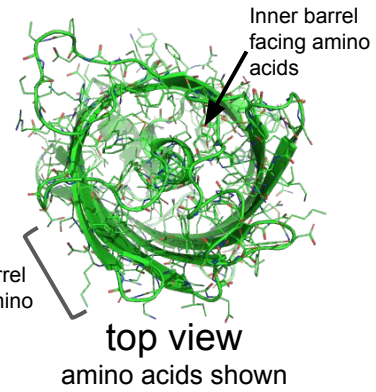
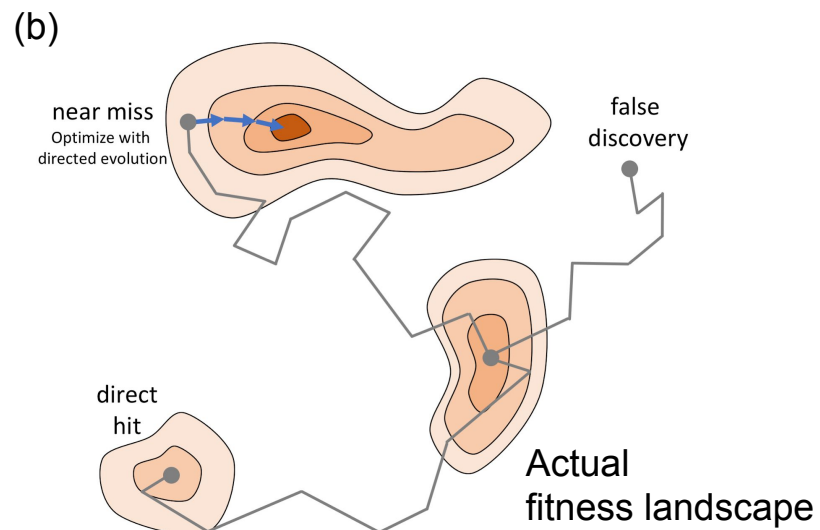
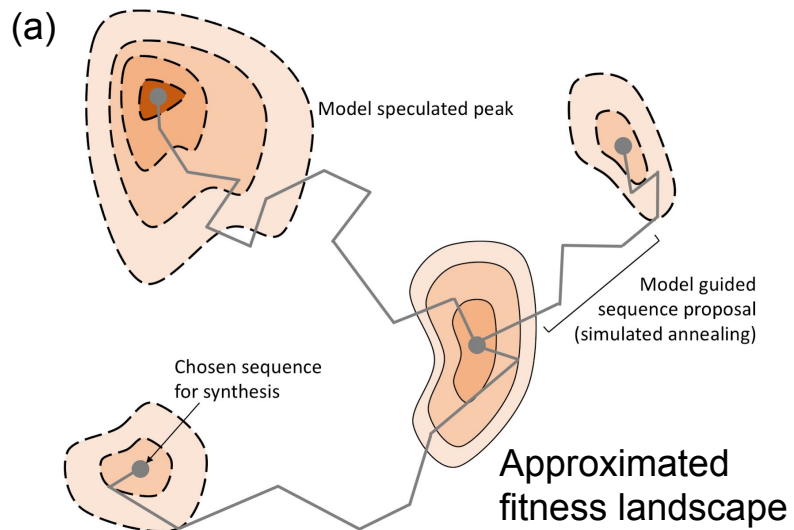


glowing
chromophore

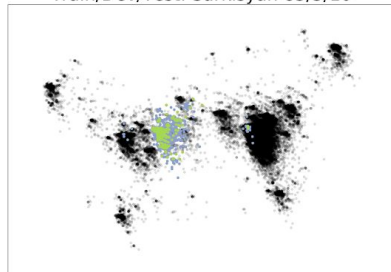
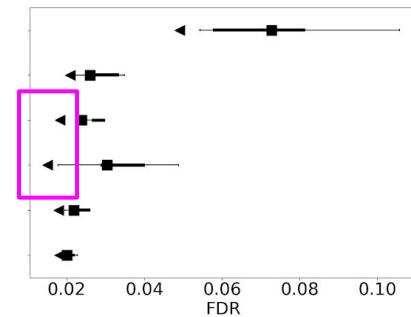
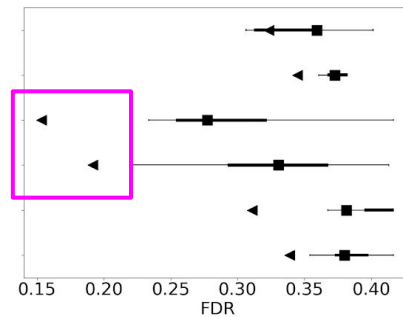
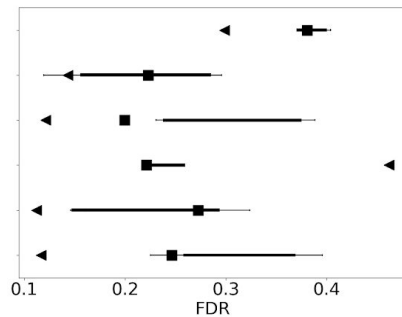
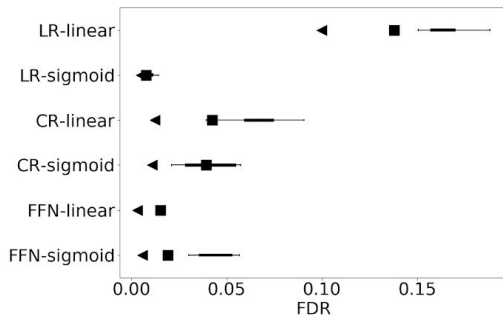
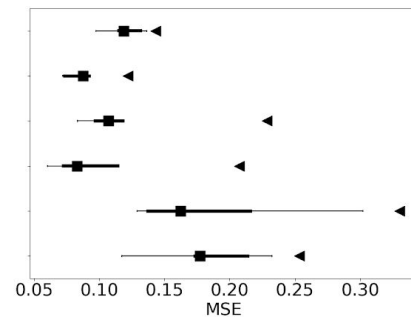
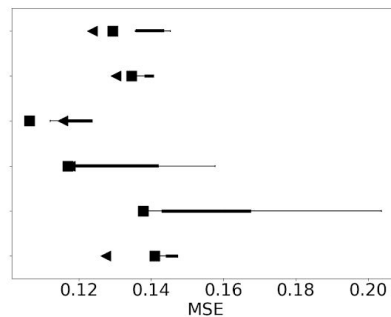
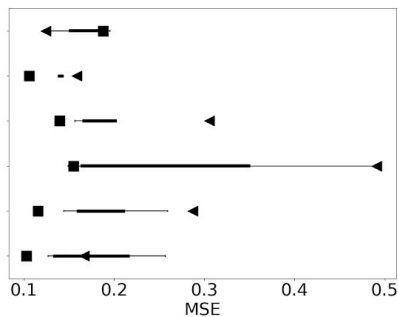
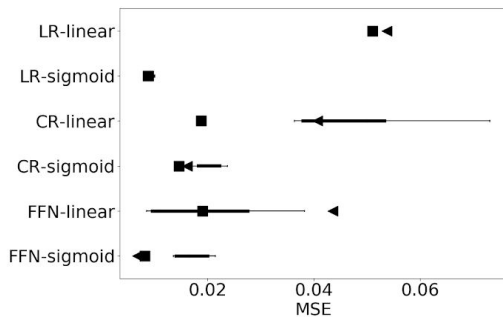
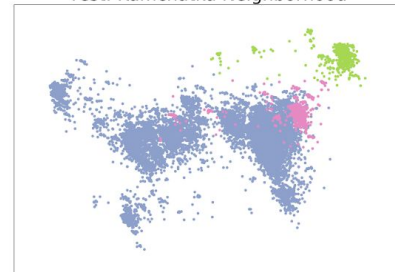


Outer barrel
facing amino
acids

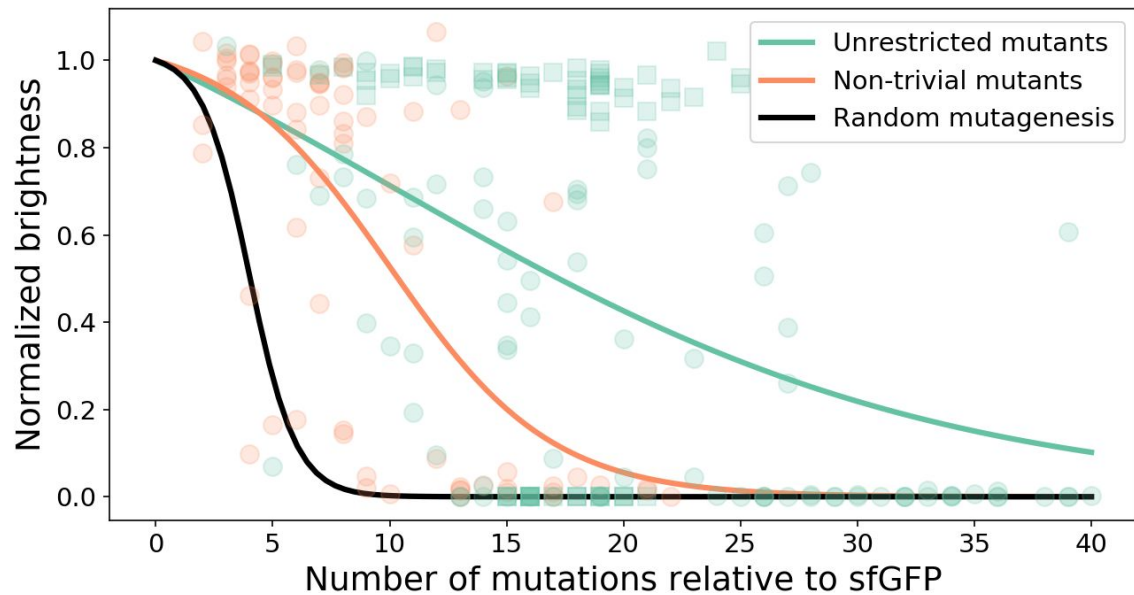




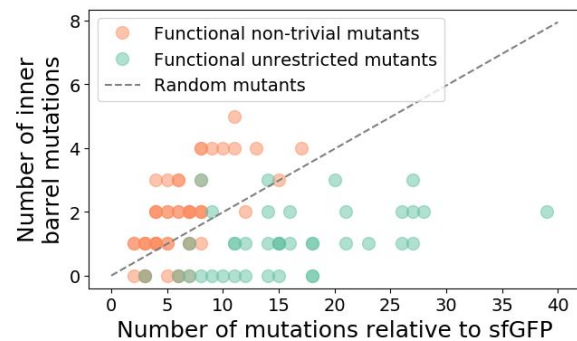
Train/Dev/Test: Sarkisyan 85/5/10

Train/Dev: Sarkisyan 90/10
Test: BreakFixTrain/Dev: 96 Designed Neighborhoods
Test: SarkisyanTrain: 94 of 96 Designed Neighborhoods
Dev: Kamchatka ancestor Neighborhood
Test: Kamchatka Neighborhood

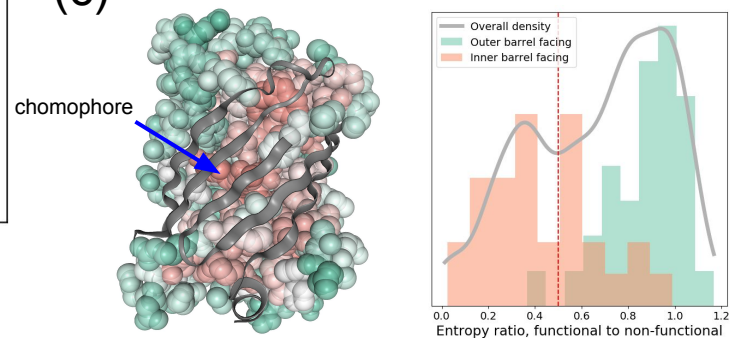
(a)

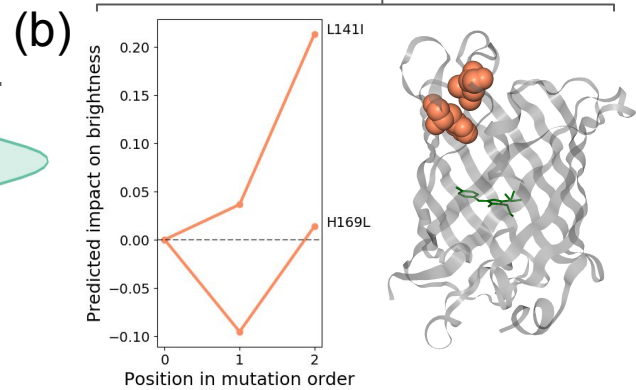
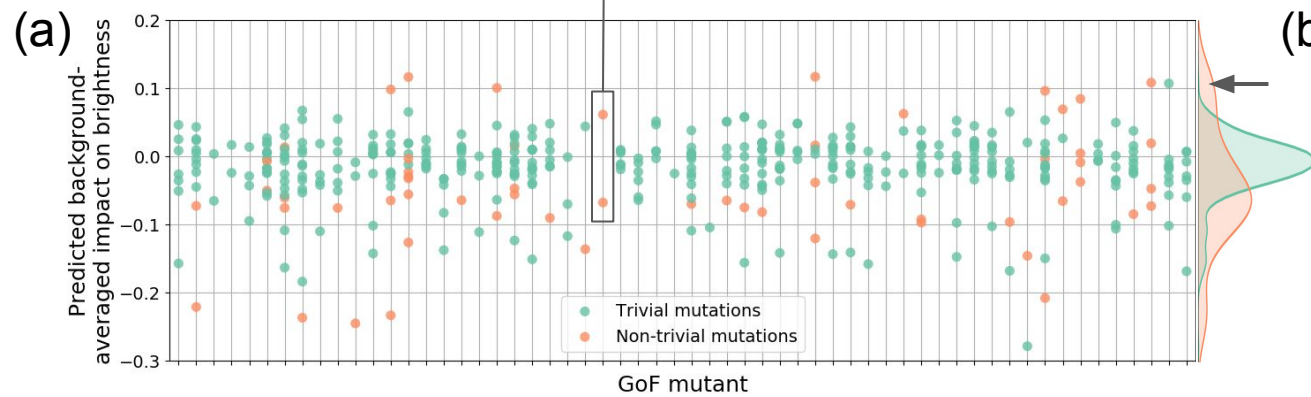


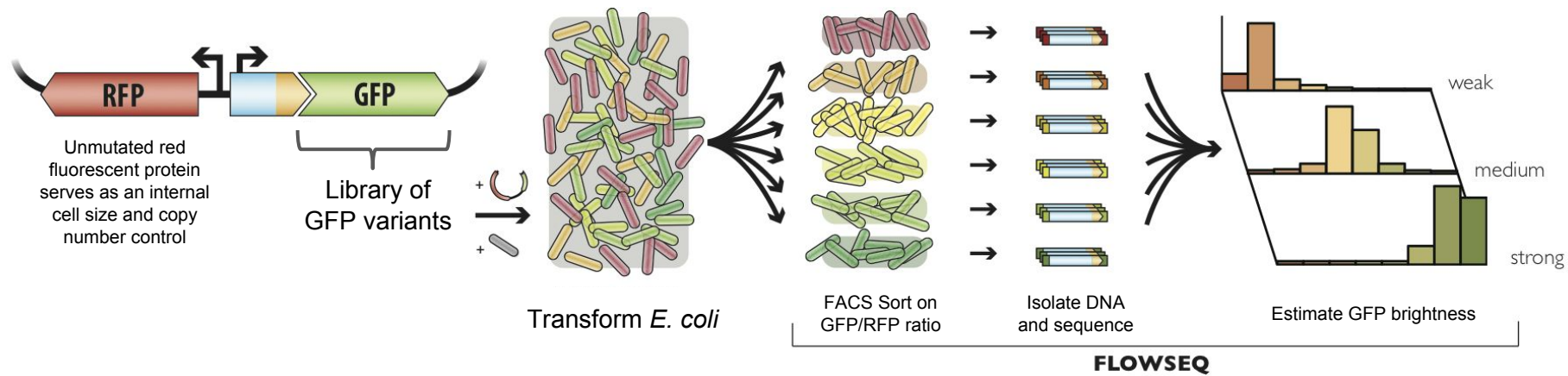
(b)

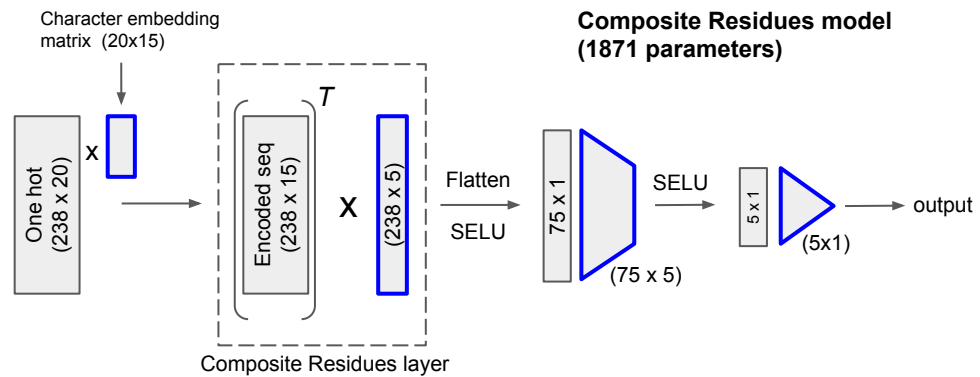


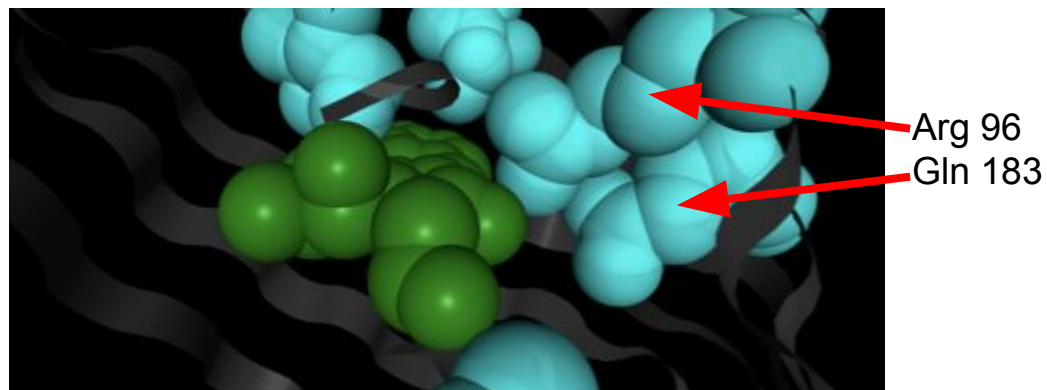
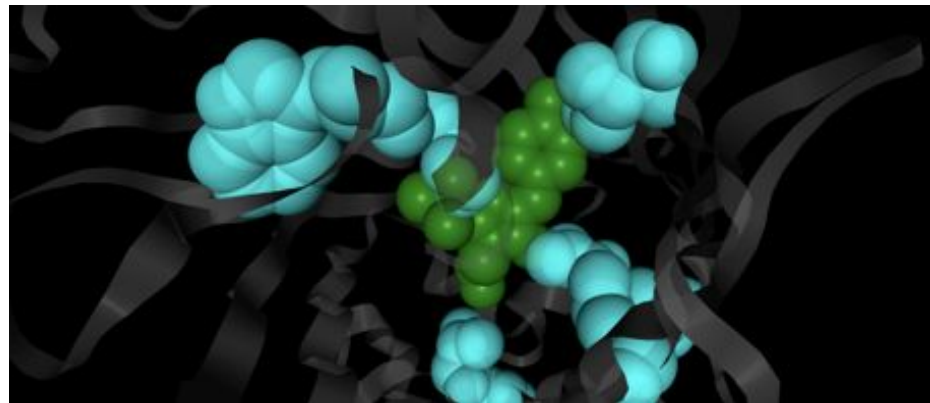
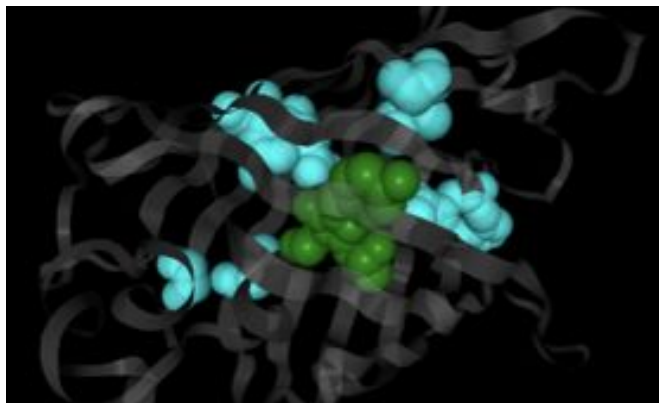
(c)

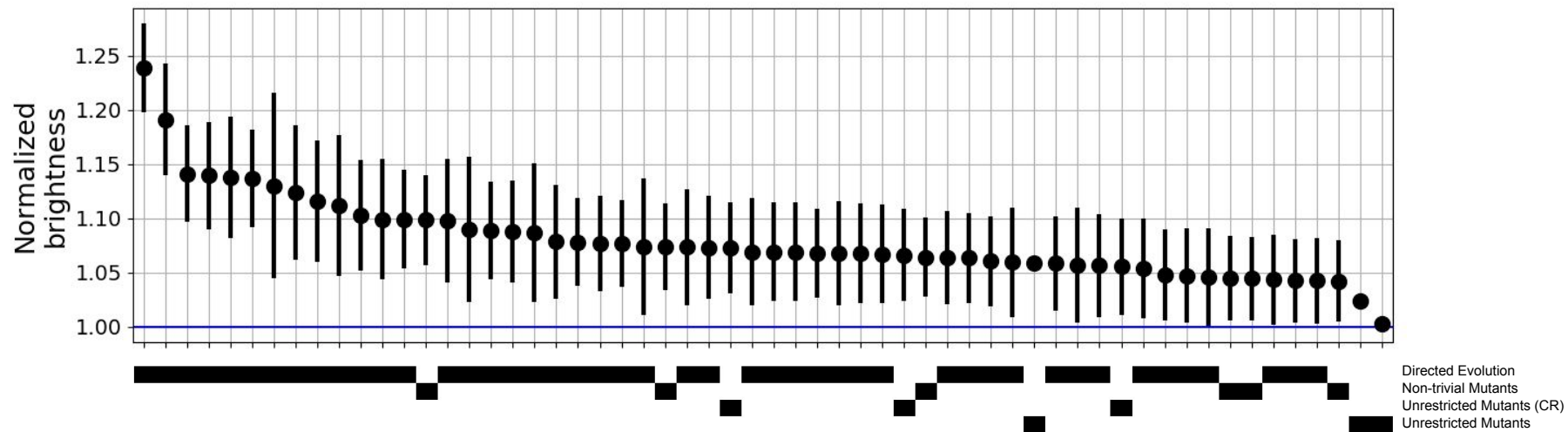




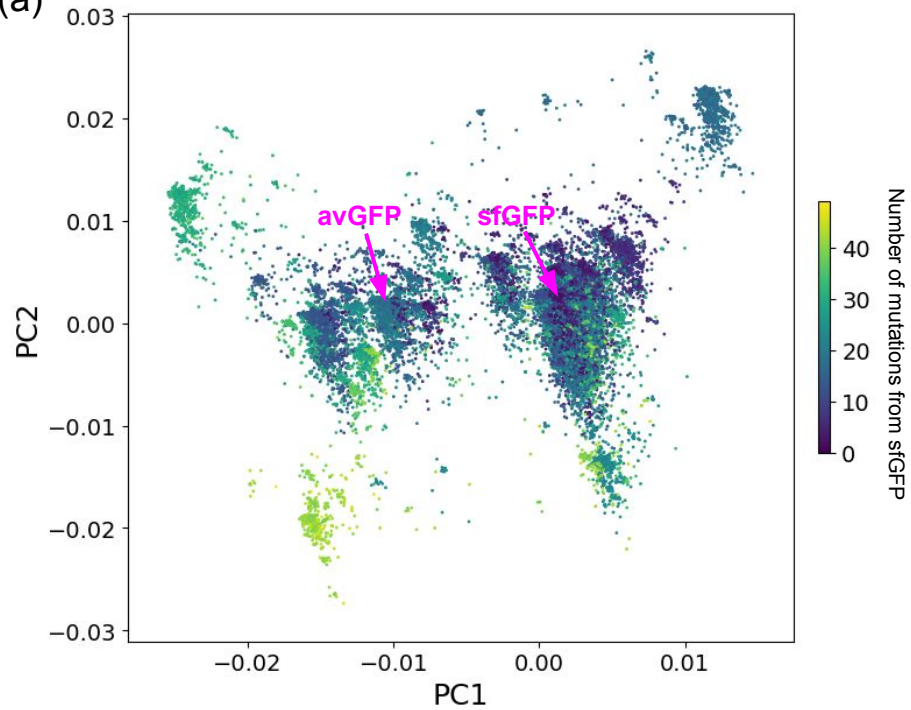




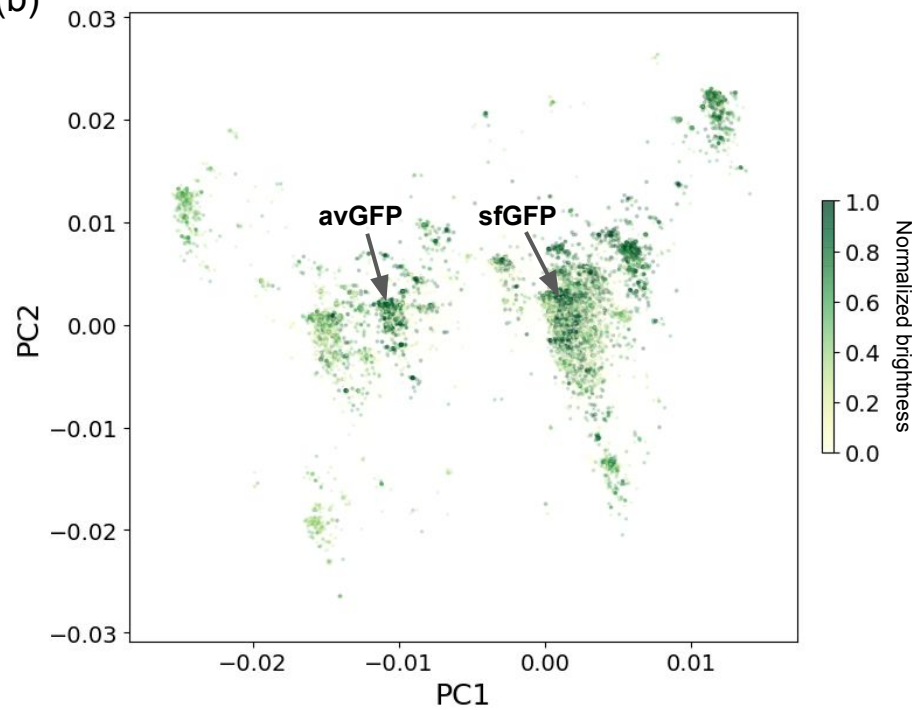


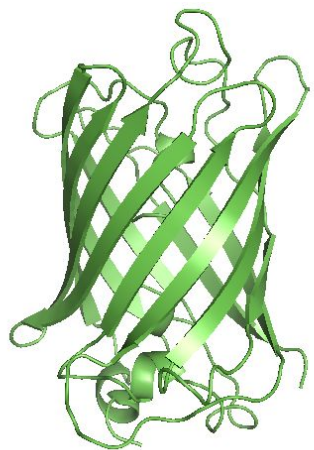


(a)



(b)

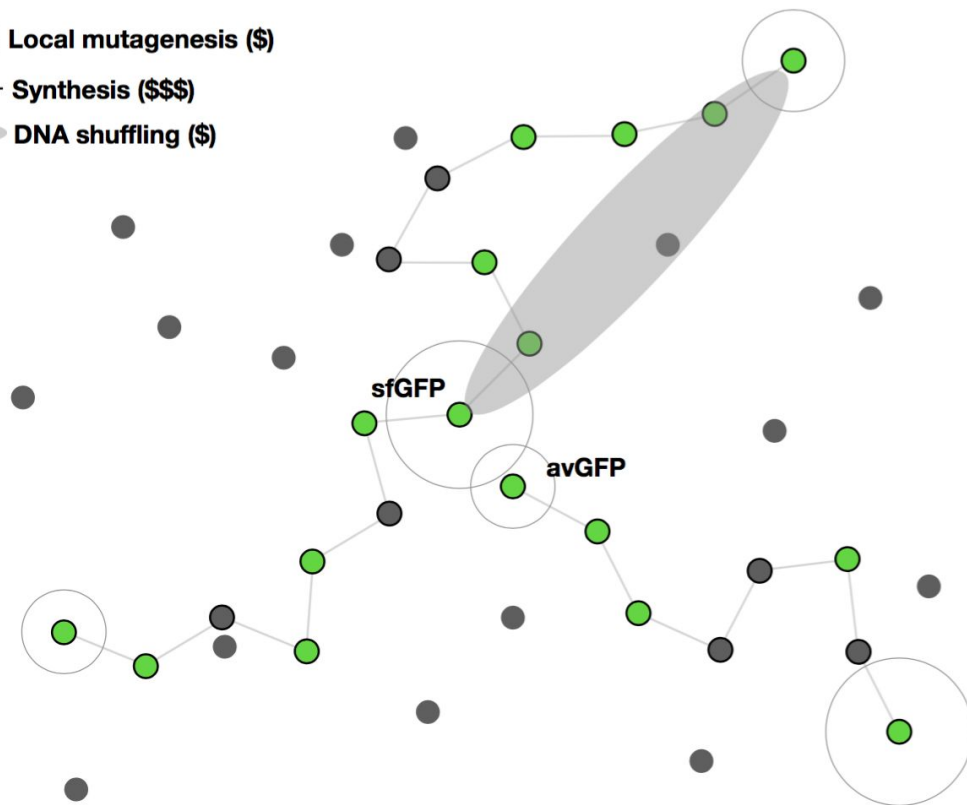


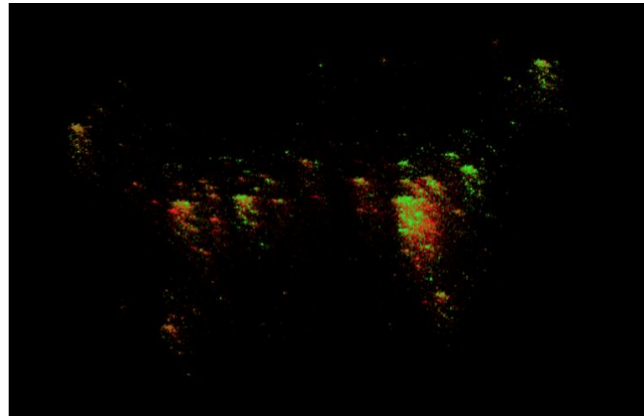
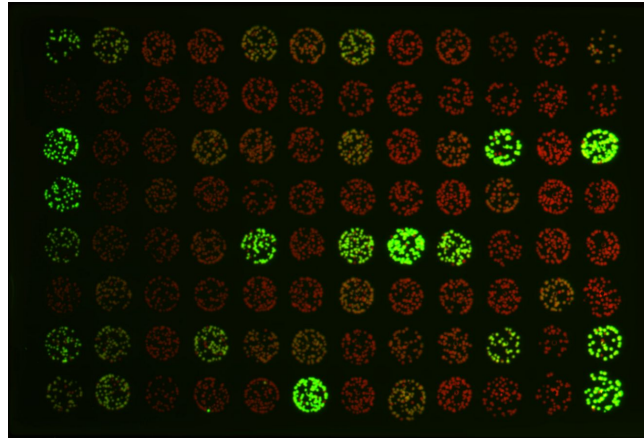


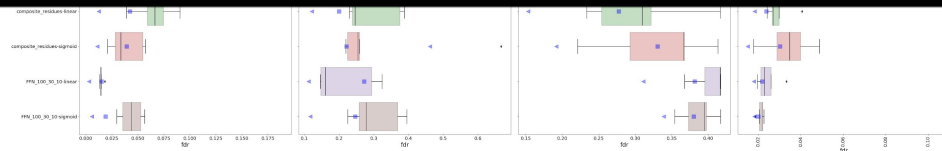
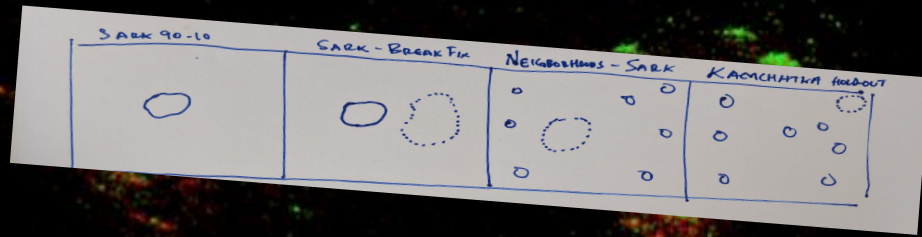
○ Local mutagenesis (\$)

-- Synthesis (\$\$\$)

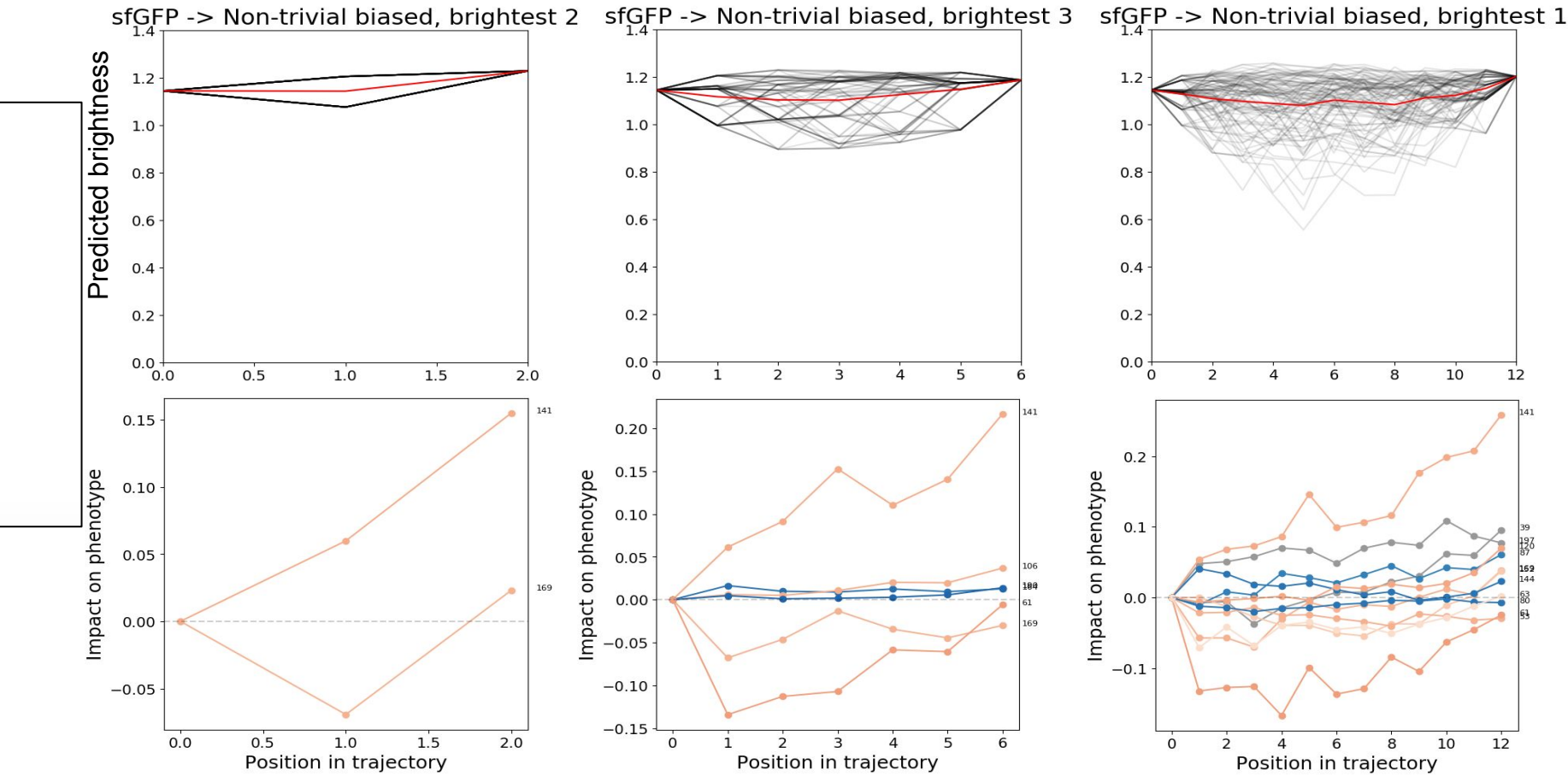
● DNA shuffling (\$)

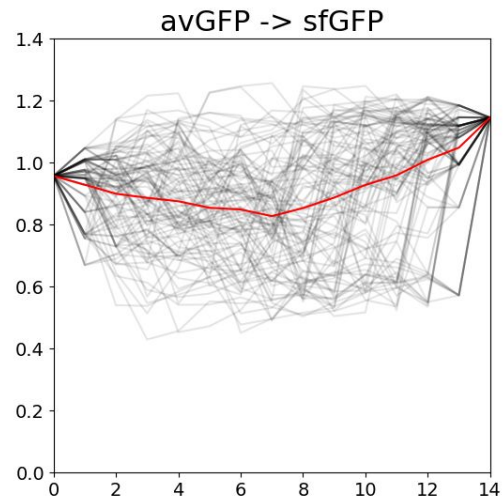






Non-trivial mutations are the biggest predicted drivers of phenotype





Structural Consequences of Chromophore Formation and Exploration of Conserved Lid Residues amongst Naturally Occurring Fluorescent Proteins

[Matthew H. Zimmer](#)^{a,b}, [Binsen Li](#)^a, [Ramza S. Shahid](#)^a, [Paola Peshkepja](#)^a and [Marc Zimmer](#)^{a,*}

