This is Supplementary data for Combinatorial bZIP dimers define complex DNA-binding specificity landscapes by José A. Rodríguez-Martínez, Aaron W. Reinke, Devesh Bhimsaria, Amy E. Keating, Aseem Z. Ansari 2017.

Supplementary file 2. MEME motifs and Sequence Specificity and Energy Landscapes (SEL) for human bZIP homodimers and heterodimers. **column 1**, bZIP dimer and dissociation constant of bZIP dimerization in the absence of DNA, from Reinke et al. (Science, 2013); **column 2**, Representative MEME motifs derived using the top 1,000 12-mer sequences ranked by CSI intensity; **column 3**, SEL displaying CSI intensities of 12-mer sequences in the 0-, 1-, 2- mismatch rings. Seed motifs used to draw SELs are shown on top; **column 4**, Box plot of CSI intensities corresponding to the first three rings (0-, 1-, 2-mismatch rings) of the SEL. bZIP heterodimer motifs were classified as Conjoined (C), Variably-spaced (V), or Emergent (E) based on the DNA binding preferences of the composing bZIPs and a notation of the category included between columns 2 and 3. Multiple MEME motifs were identified for some homodimers and heterodimers. In such cases, motifs are bracketed in column 1.
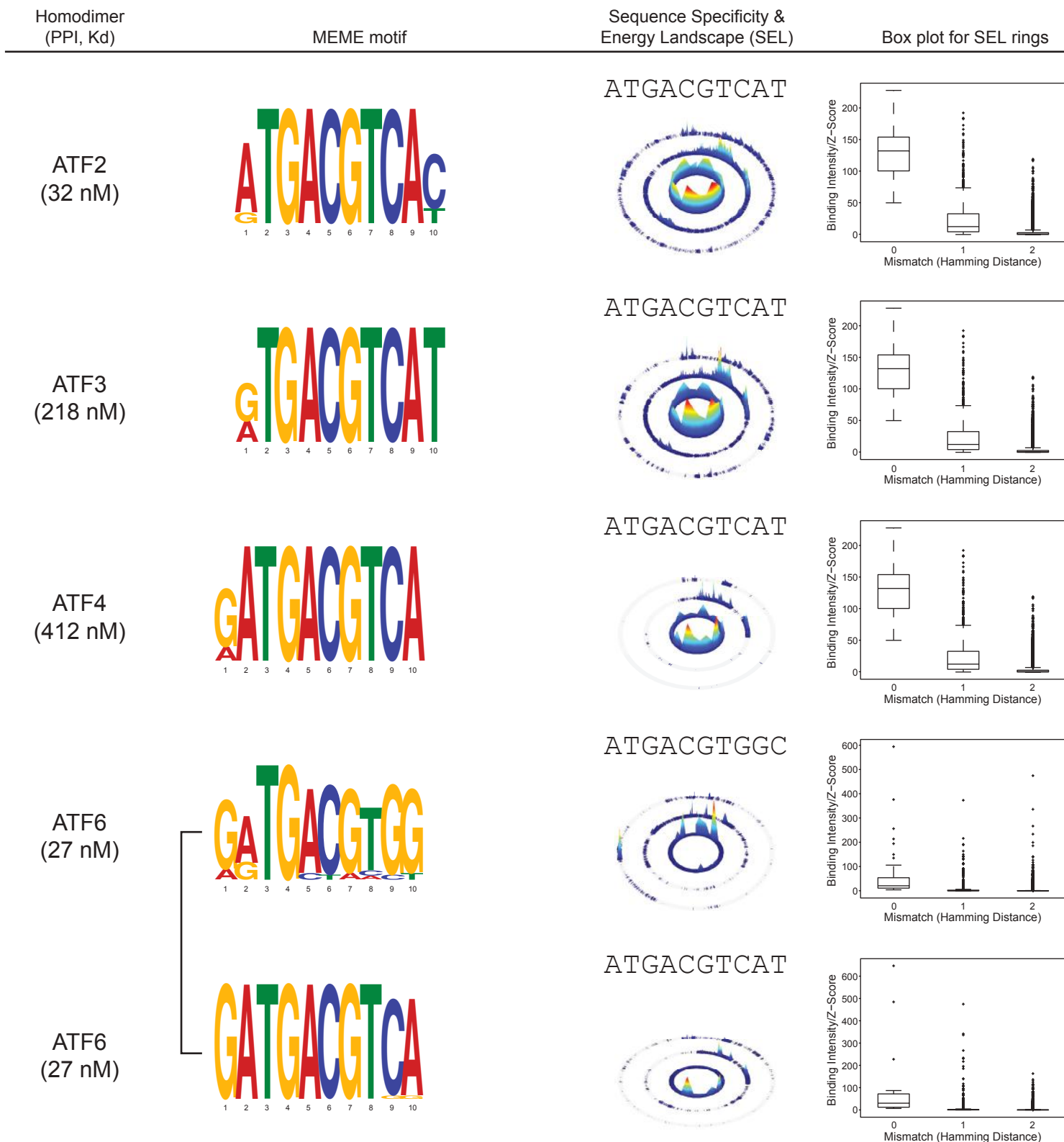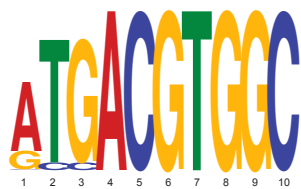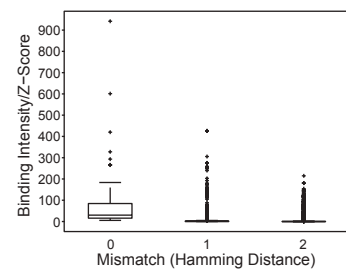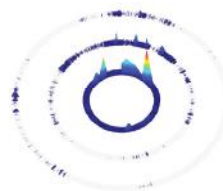
Homodimer (PPI, Kd)	MEME motif	Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
ATF2 (32 nM)		ATGACGTCAT	
ATF3 (218 nM)		ATGACGTCAT	
ATF4 (412 nM)		ATGACGTCAT	
ATF6 (27 nM)		ATGACGTGGC	
ATF6 (27 nM)		ATGACGTCAT	

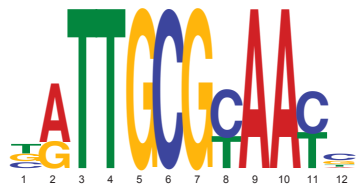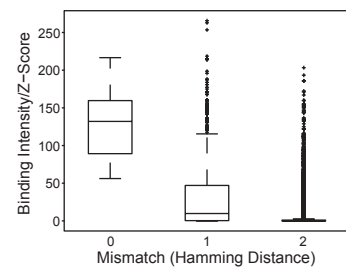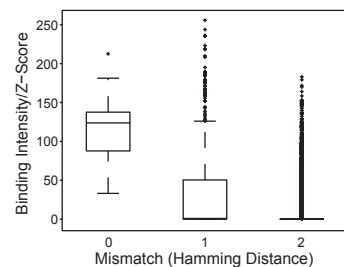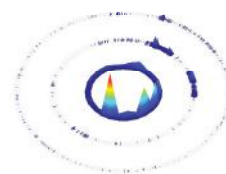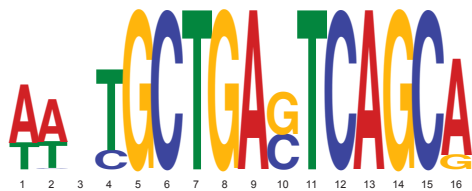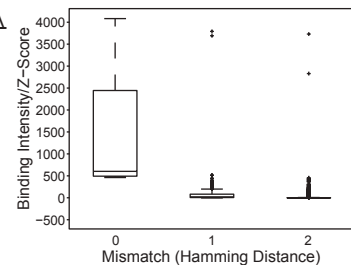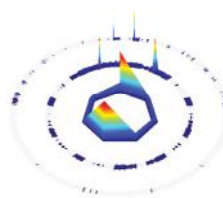| Homodimer (PPI, Kd)	MEME motif	Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
ATF6B (<1 nM)		ATGACGTGGC	
ATF6B (<1 nM)		ATGACGTCAT	
BATF3 (128 nM)		ATGACGTCAT	
CEBPA (10 nM)		ATTGCGCAAT	
CEBPE (3 nM)		ATTGCGCAAT	
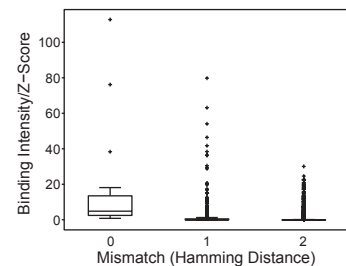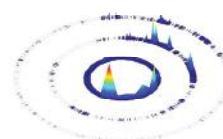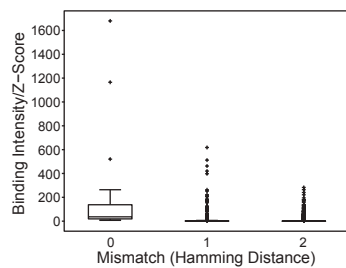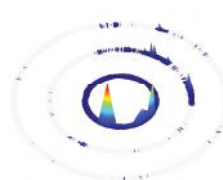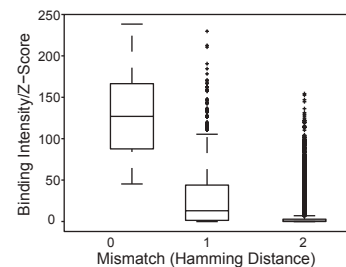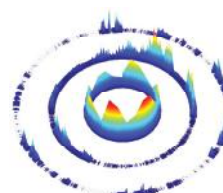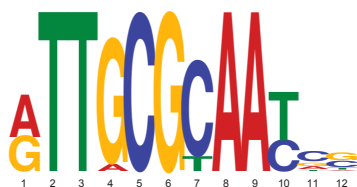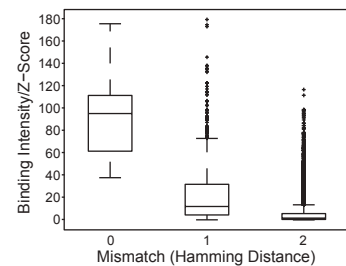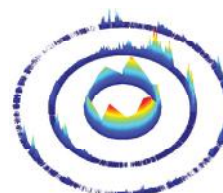
Homodimer (PPI, Kd)	MEME motif	Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
CEBPG (<1 nM)		ATTGCGCAAT	
CREB1 (15 nM)		ATGACGTCAT	
CREB3 (93 nM)		ATGACGTGGC	
CREB3L1 (10 nM)		ATGACGTGGC	
CREB3L1 (10 nM)			
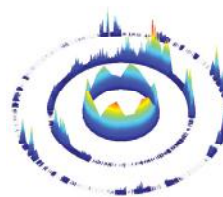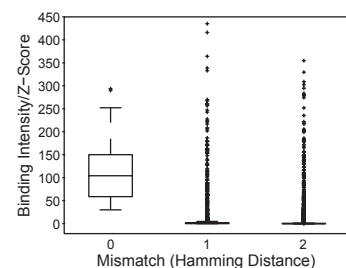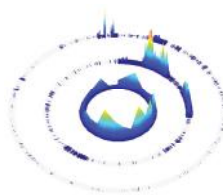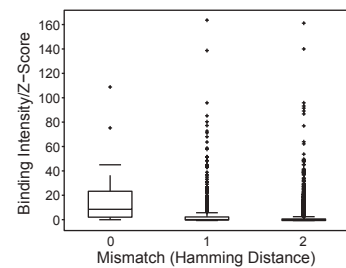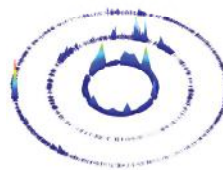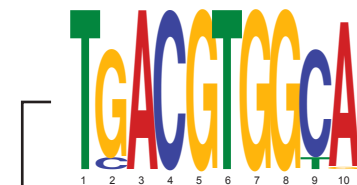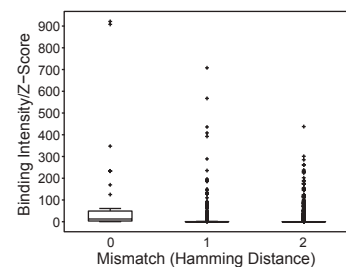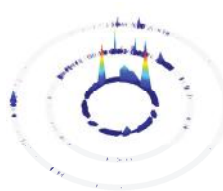
Homodimer (PPI, Kd)	MEME motif	Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings

DBP
(8 nM)

ATTACGTAAT
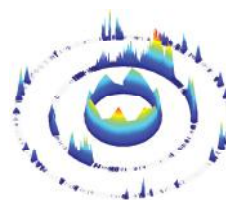
FOSL1
(>5000 nM)

ATGACGTCAT
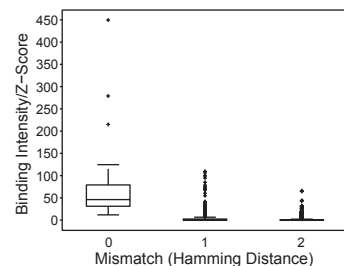
HLF
(3 nM)

ATTACGTAAT
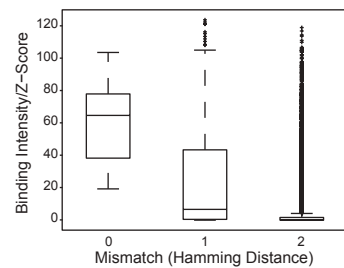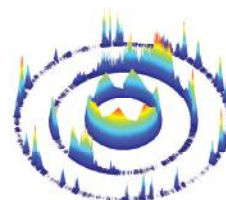
JUN
(314 nM)

ATGACGTCAT
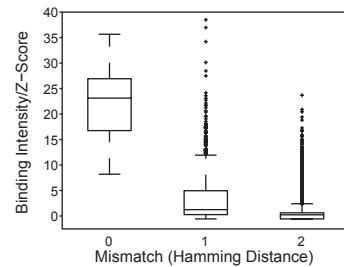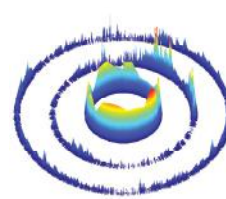
JUN
(314 nM)

ATGAGTCAT
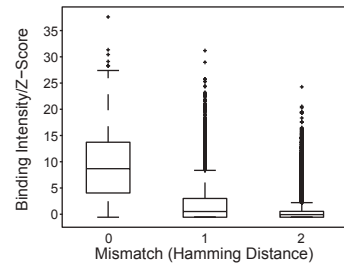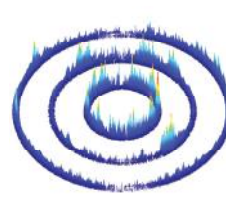
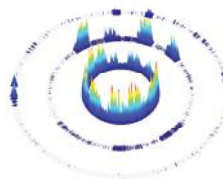| Homodimer (PPI, Kd)	MEME motif	Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings

MAFB (62 nM)

TGCTGAGTCAGCA

MAFG (15 nM)
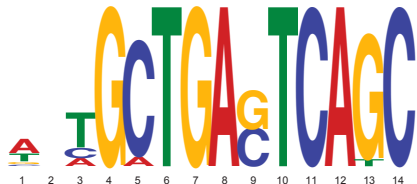
TGCTGAGTCAGCA
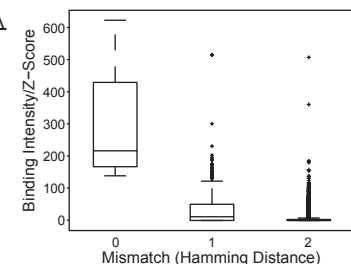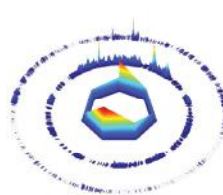
NFE2 (656 nM)

ATGAGTCAT
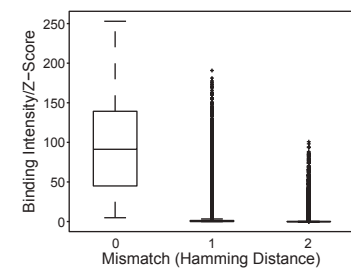
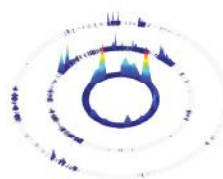**NFE2L1 (27 nM)**
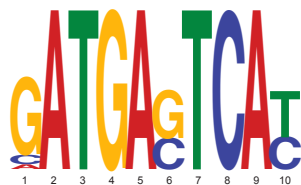
ATGAGTCAT
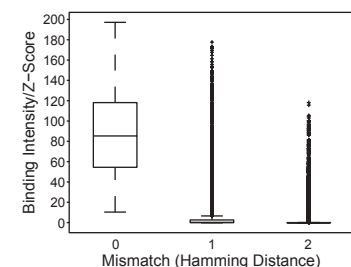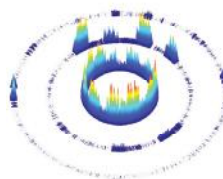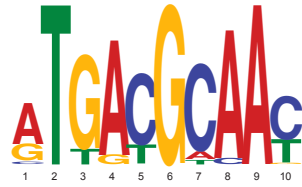

NFIL3 (73 nM)

ATTACGTAAT
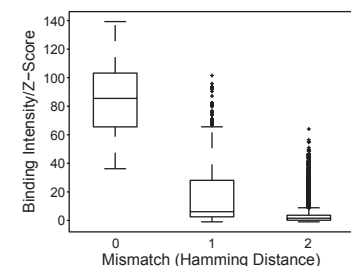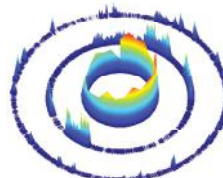
XBP1 (8 nM)
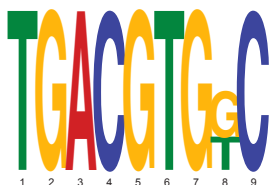
ATGACGTGGC
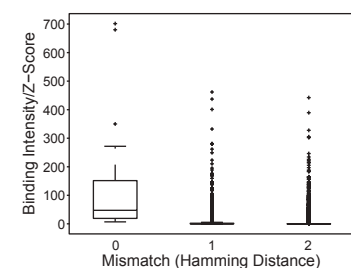
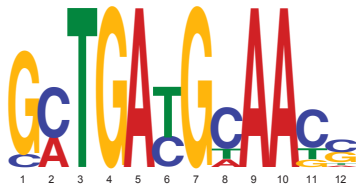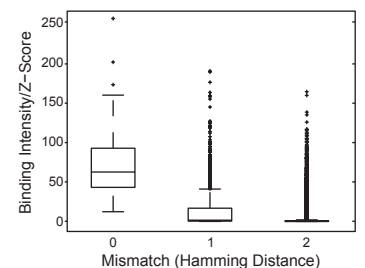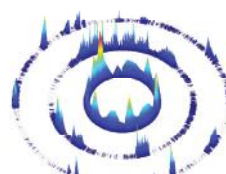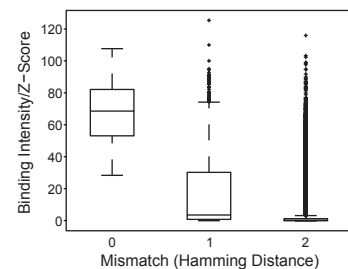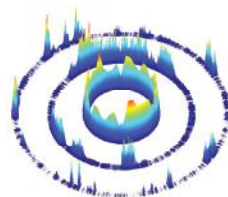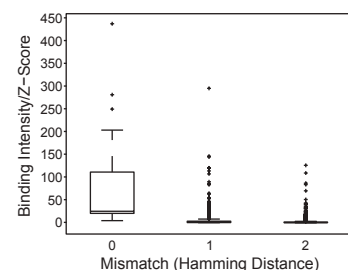| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.		Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
ATF3•CEBPA (13 nM)		C	ATGACGCAAT	
ATF3•CEBPG (<1 nM)		C	ATGACGCAAT	
ATF4•CEBPA (<1 nM)		C	ATGACGCAAT	
ATF4•CEBPG (<1 nM)		C	ATGACGCAAT	
ATF5•CEBPA (54 nM)		C	ATGACGCAAT	
ATF5•CEBPE (28 nM)		C	CTGATGCAAC	
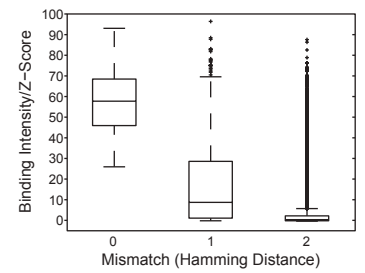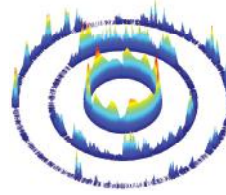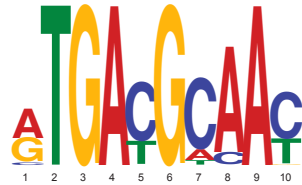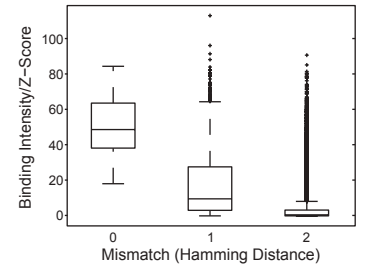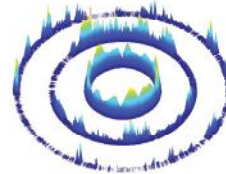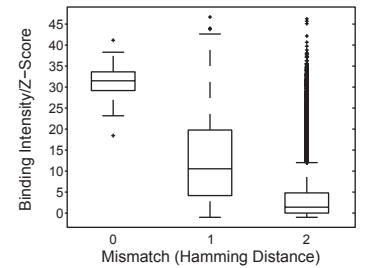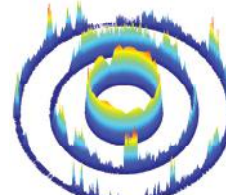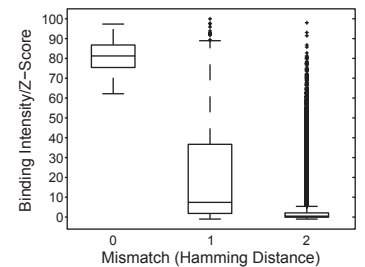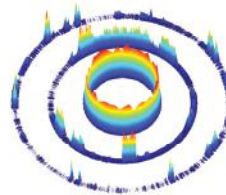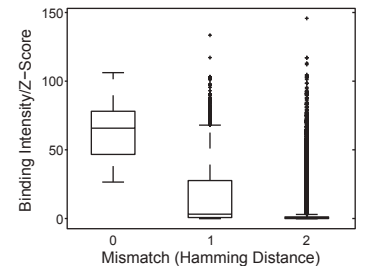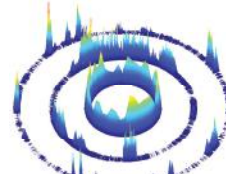
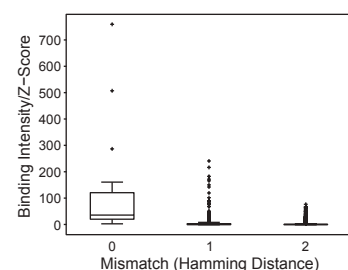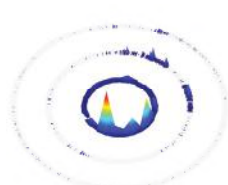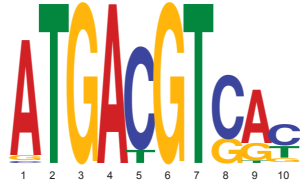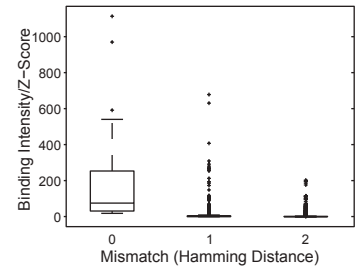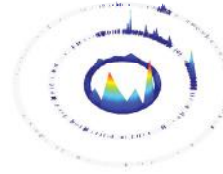| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.	SeqEence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
ATF5•CEBPG (<1 nM)	C	ATGACGCAAT	
ATF5•ATF6B (>5000 nM)	C	ATGACGTCAT	
ATF5•BATF (187 nM)	C	ATGACGTCAT	
ATF5•BATF2 (>5000 nM)	E	ATGACGTGGC	
ATF5•BATF3 (385 nM)	E	ATGACGTGGC	
ATF5•CREBZF (1541 nM)	C	ATGACGTCAT	
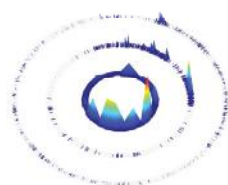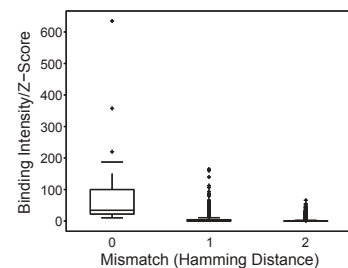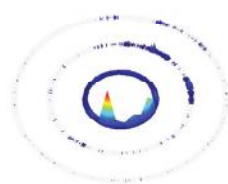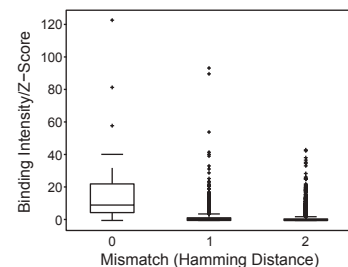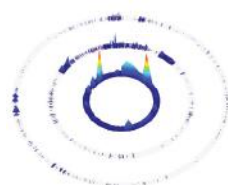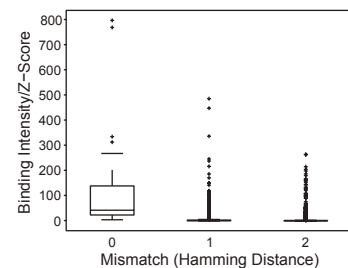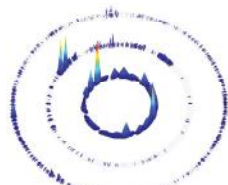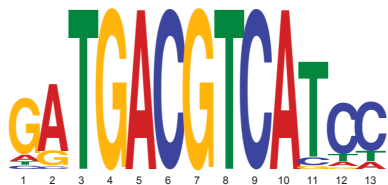
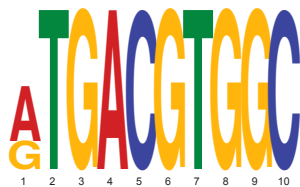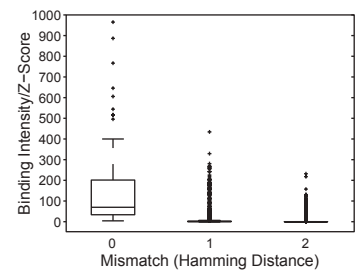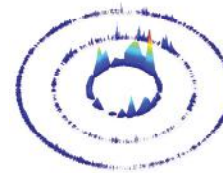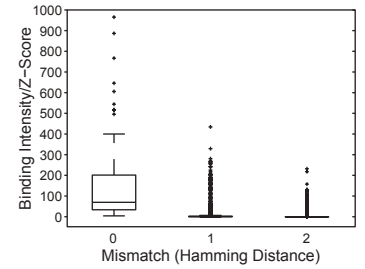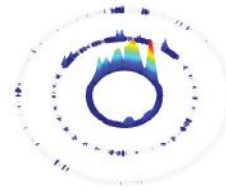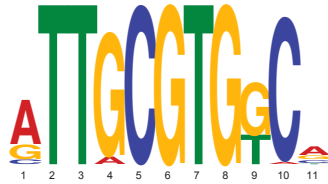| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.		Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
ATF5•CREB3L1 (>5000 nM)		C	ATGACGTCAT	
ATF5•CREB3L3 (>5000 nM)		C	ATGACGTCAT	
ATF5•FOS (>5000 nM)		C	ATGACGTCAT	
ATF5•JUN (>5000 nM)		C	ATGACGTCAT	
ATF5•JUNB (>5000 nM)		C	ATGACGTCAT	
BATF•ATF3 (17 nM)		E	ATGACGTGGC	
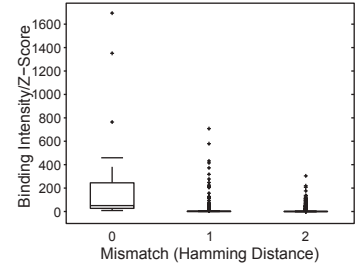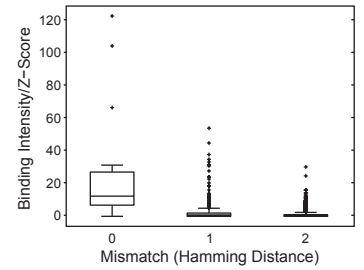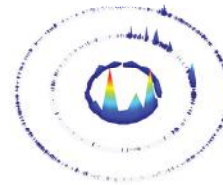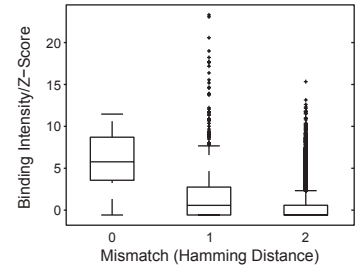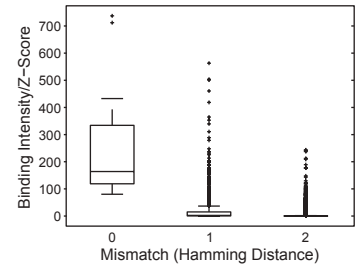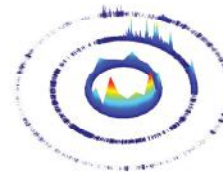
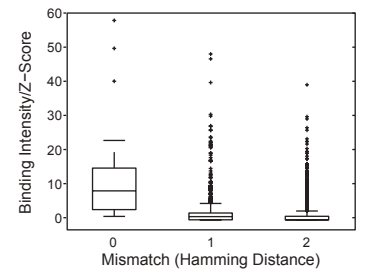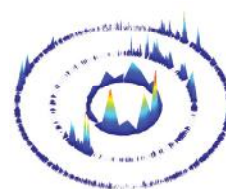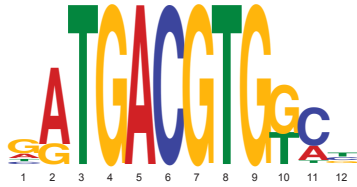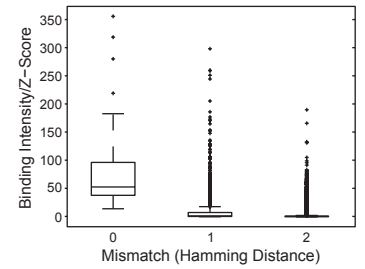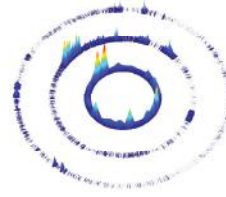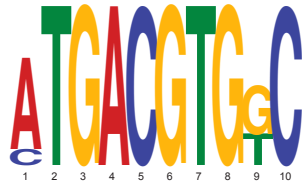| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.		Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
BATF•CEBPA (10 nM)		E	ATTGCGTGGC	
BATF•CEBPE (23 nM)		E	ATTGCGTGGC	
BATF•CEBPG (<1 nM)		C	ATGACGCAAT	
BATF•CEBPG (<1 nM)		C	ATTGCGTGGC	
BATF•HLF (21 nM)		C	ATGACGTCAT	
BATF•NFIL3 (291 nM)		C	ATGACGTCAT	
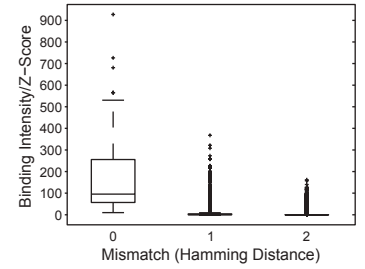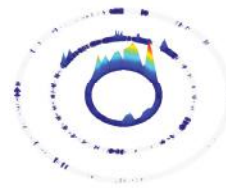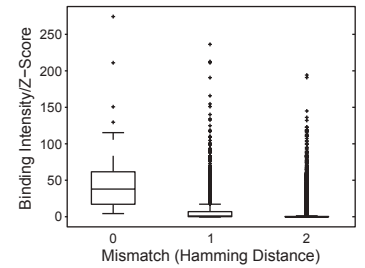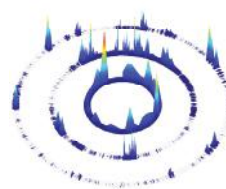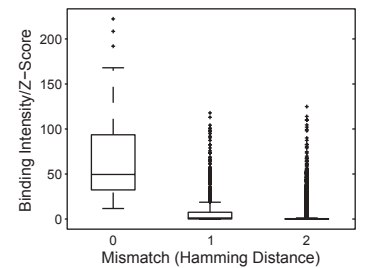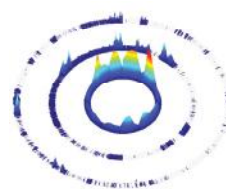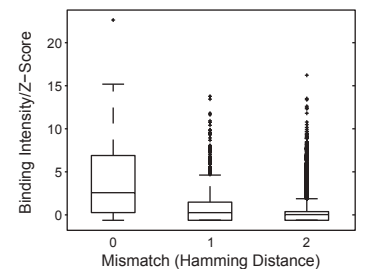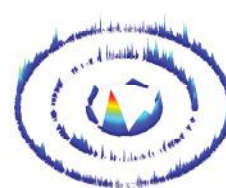
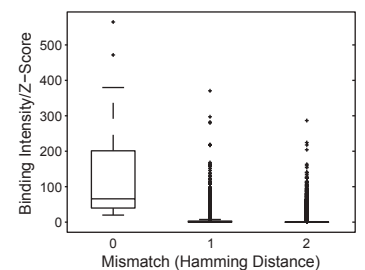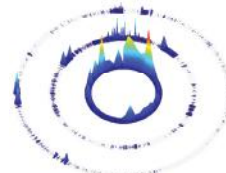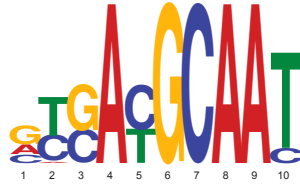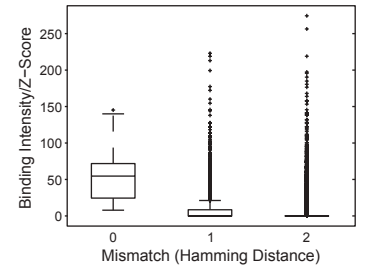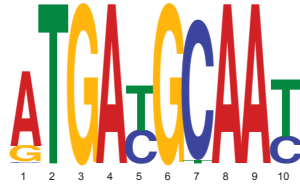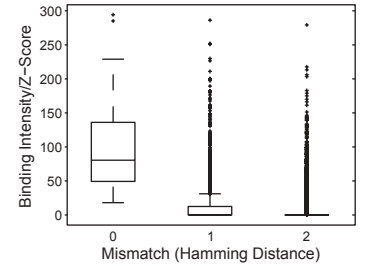| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.		Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
BATF2•ATF3 (429 nM)		E	ATGACGTGGC	
BATF2•ATF4 (11 nM)		E	ATGACGTGGC	
BATF2•JUN (<1 nM)		V	ATGAGTCAT	
BATF2•JUN (<1 nM)		E	ATGACGTGGC	
BATF3•ATF3 (5 nM)		E	ATGACGTGGC	
BATF3•ATF4 (4 nM)		E	ATGACGTGGC	
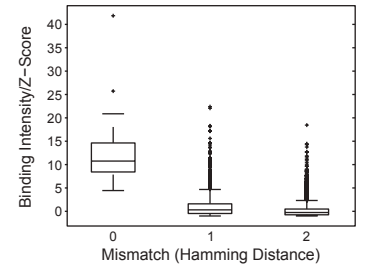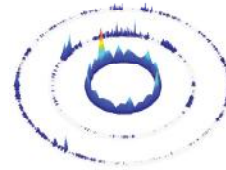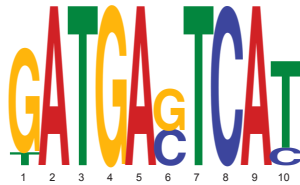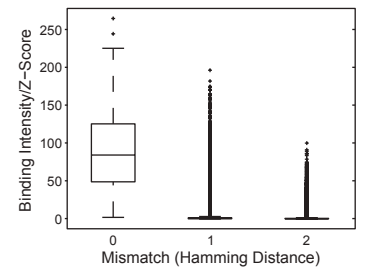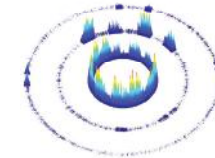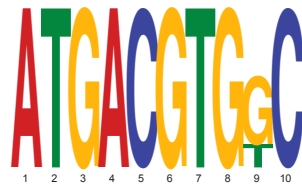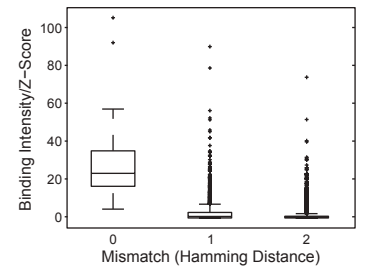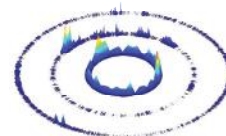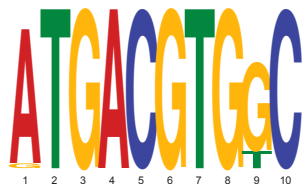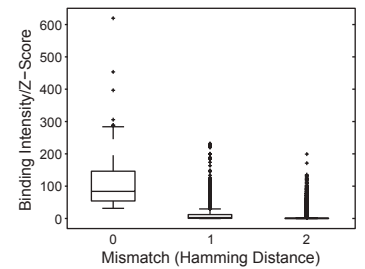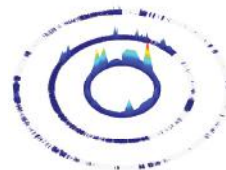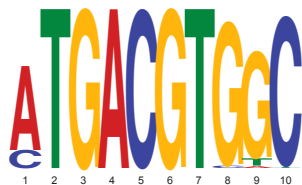
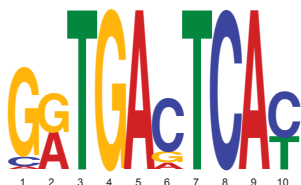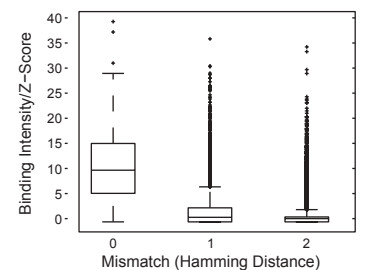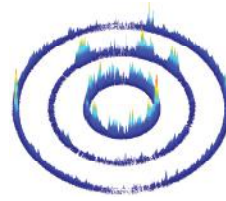| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.		Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
BATF3•CEBPA (5 nM)		C	ATGACGCAAT	
BATF3•CEBPG (2 nM)		C	ATGACGCAAT	
BATF3•NFIL3 (150 nM)		E	ATGACGTGGC	
DDIT3•CEBPG (<1 nM)		E	ATTGCA	
FOS•ATF2 (5 nM)		C	ATGACGTCAT	
FOS•ATF3 (185 nM)		V	ATGAGTCAT	
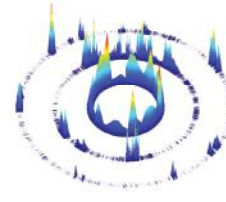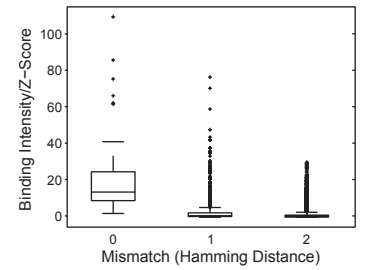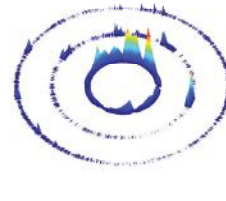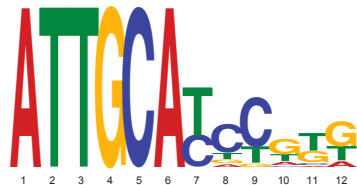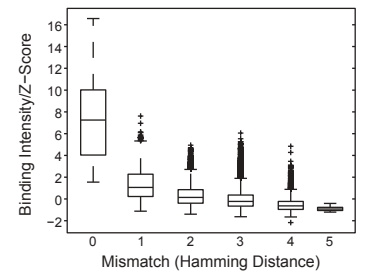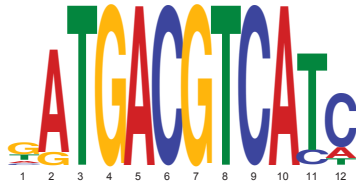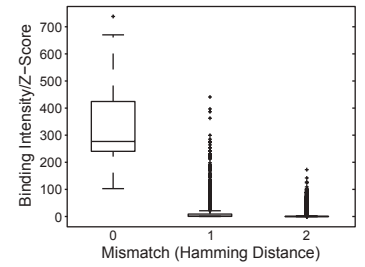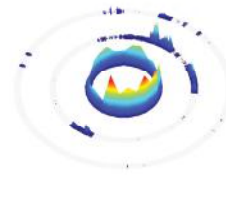
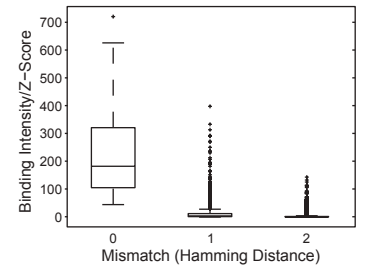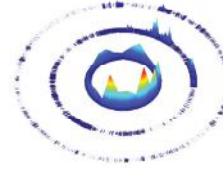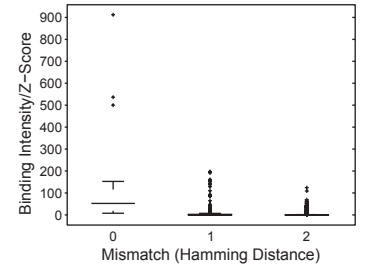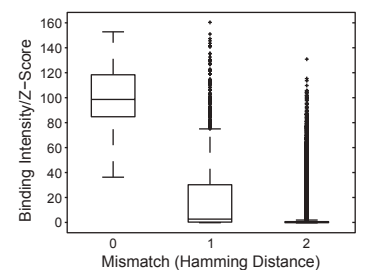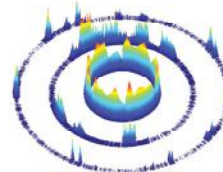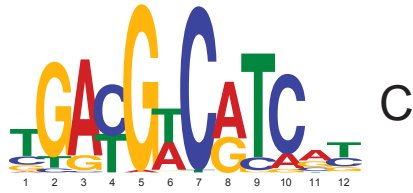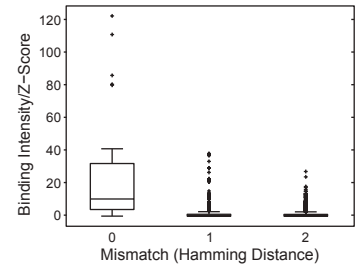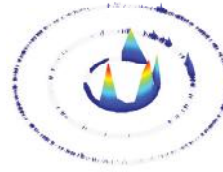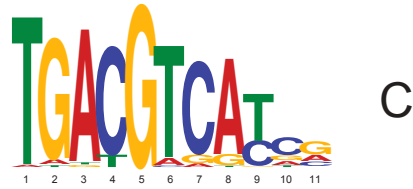| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.		Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
FOS•ATF4 (4 nM)		C	ATGACGTCAT	
FOS•BATF (3593 nM)		C	ATGACGTCAT	
FOS•BATF2 (>5000 nM)		C	ATGACGTCAT	
FOS•BATF3 (481nM)		C	ATGACGTCAT	
FOS•CEBPE (239nM)		V	ATGAGCAAT	
FOS•CEBPG (26nM)		C	ATGACGCAAT	
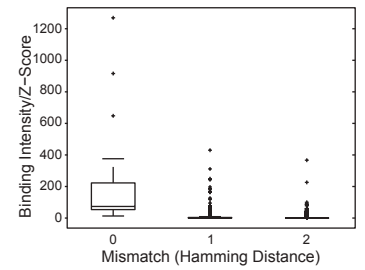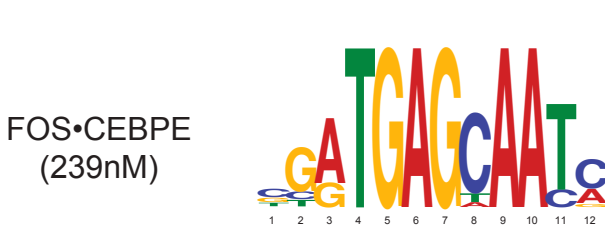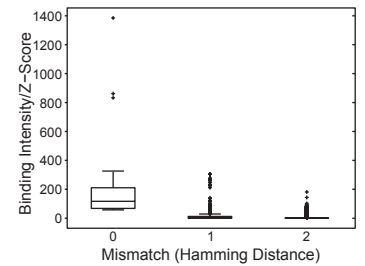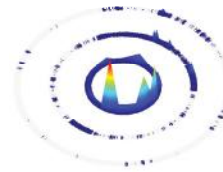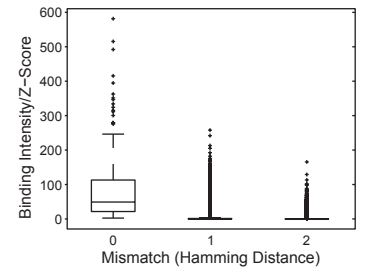
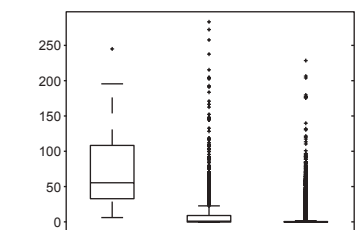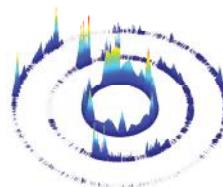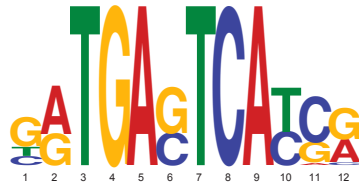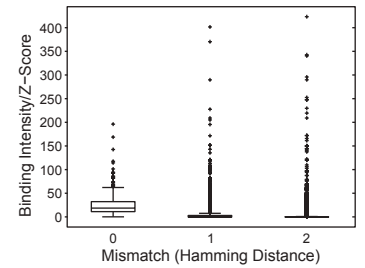| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.	Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
FOS•CREB3 (>5000 nM)	C	ATGACGTCAT	
FOS•CREB3L3 (>5000 nM)	C	ATGACGTCAT	
FOS•DBP (>5000 nM)	C	ATGACGTTAC	
FOS•FOSL1 (<1 nM)	C	ATGAGTCAT	
FOS•JUN (<1 nM)	V	ATGAGTCAT	
FOS•MAFB (63 nM)	C	GCTGAGTCAT	
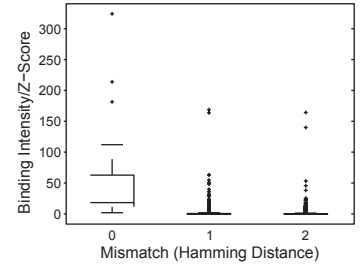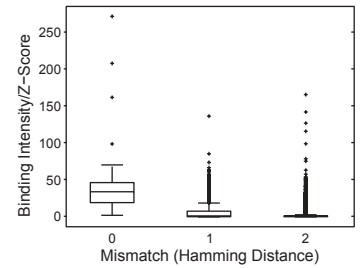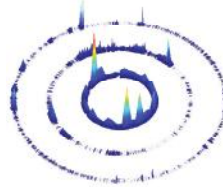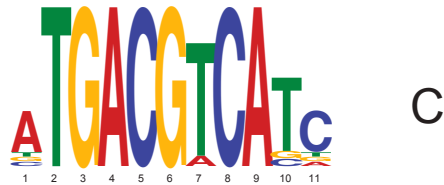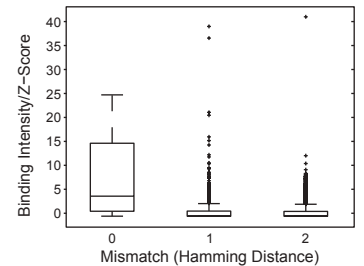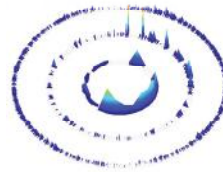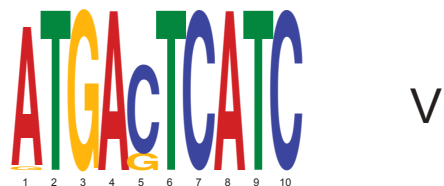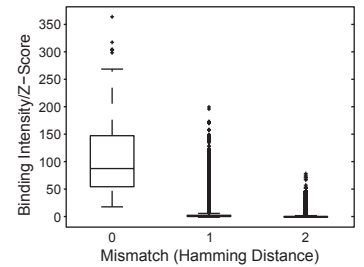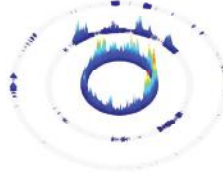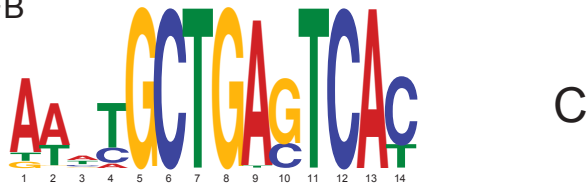
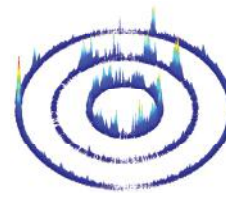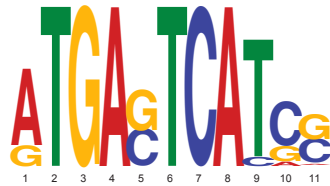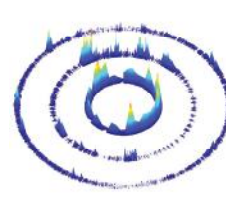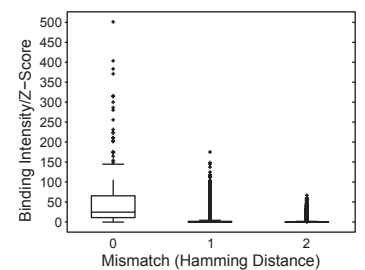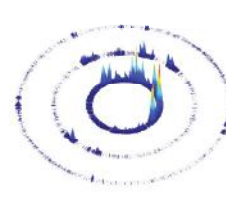| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.		Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
FOS•NFE2 (>5000 nM)		C	ATGAGTCAT	
FOS•NFE2L1 (>5000 nM)		C	ATGAGTCAT	
FOSL1•ATF3 (233 nM)		V	ATGAGTCAT	
FOSL1•BATF3 (481 nM)		V	ATGAGTCAT	
FOSL1•CEBPA (349 nM)		C	ATGACGCAAT	
FOSL1•CEBPE (266 nM)		V	ATGAGCAAT	
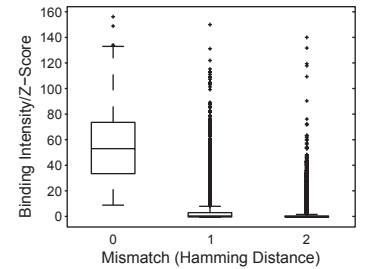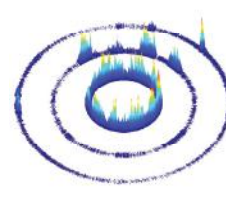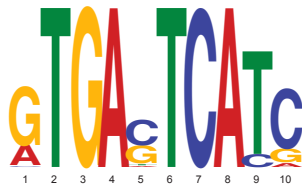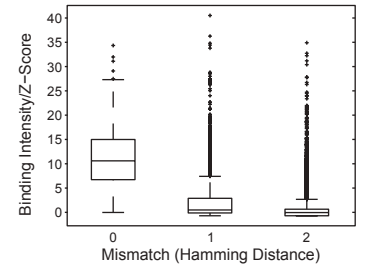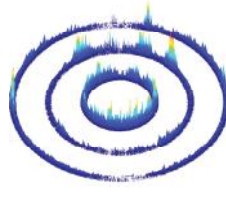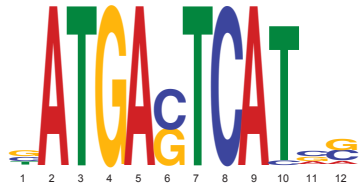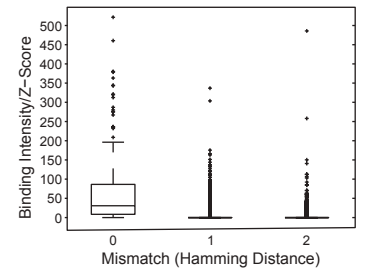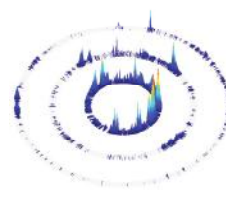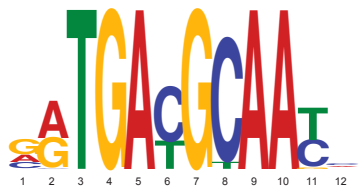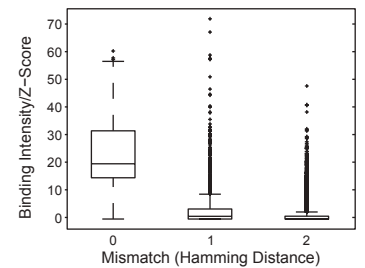
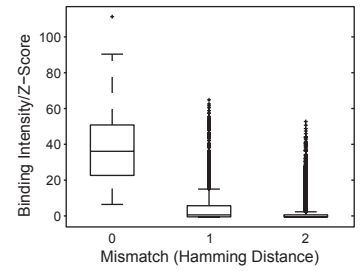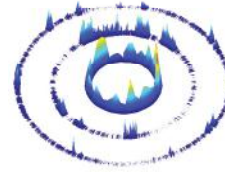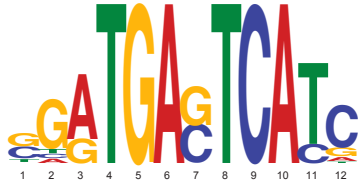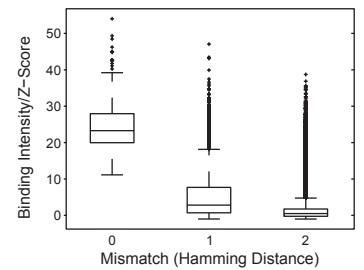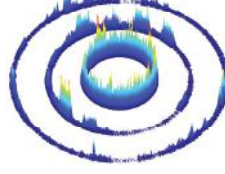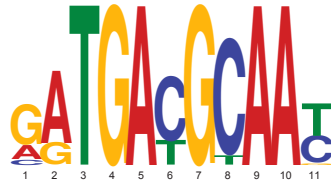| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.		Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
FOSL1•CEBPG (103 nM)		C	ATGACGCAAT	
FOSL1•JUN (<1 nM)		V	ATGAGTCAT	
FOSL1•NFE2 (>5000 nM)		C	ATGAGTCAT	
FOSL1•NFE2L1 (>5000 nM)		C	ATGAGTCAT	
JUN•ATF3 (5 nM)		C	ATGAGTCAT	
JUN•ATF3 (5 nM)		C	ATGACGCAT	
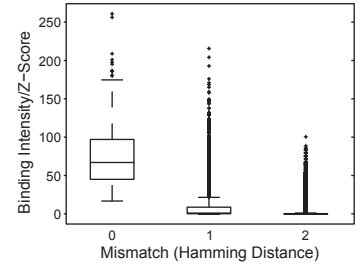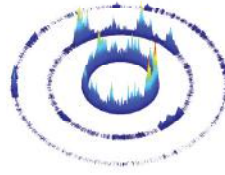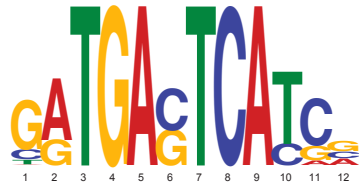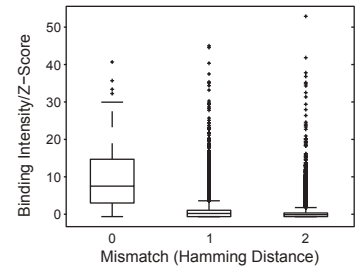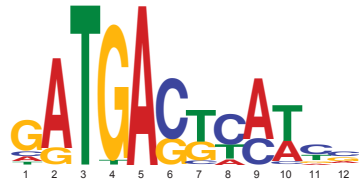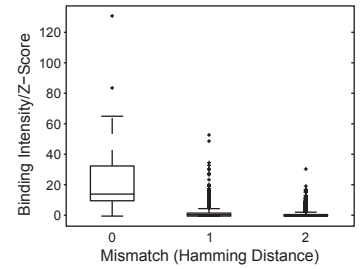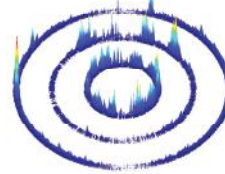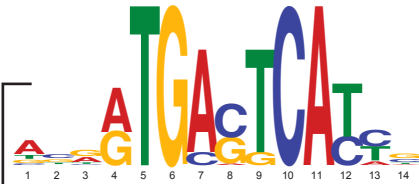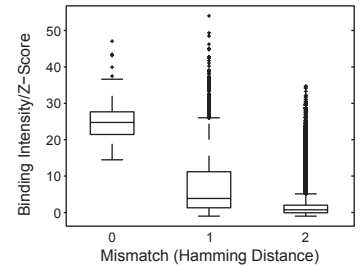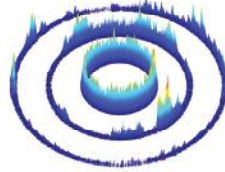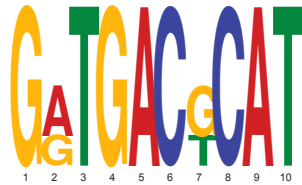
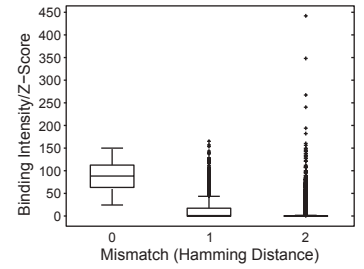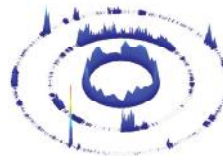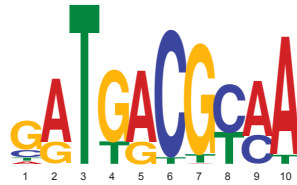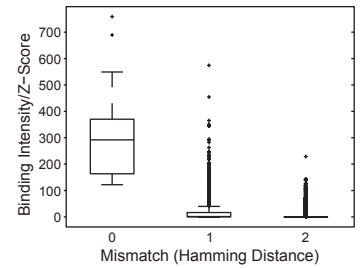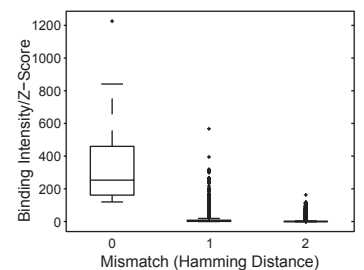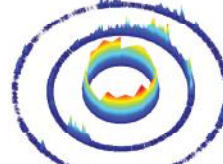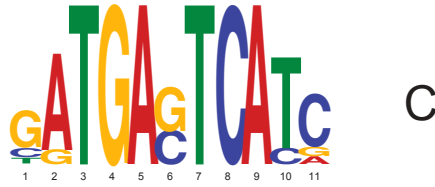| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.	Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
JUN•CEBPA (>5000 nM)	C	ATGACGCAAT	
JUN•CEBPG (289 nM)	C	ATGACGCAAT	
JUNB•ATF2 (891nM)	C	ATGACGTCAT	
JUNB•ATF3 (8nM)	C	ATGAGTCAT	
JUNB•ATF3 (8nM)	C	ATGACGTCAT	
JUNB•ATF4 (266 nM)	C	ATGACGTCAT	
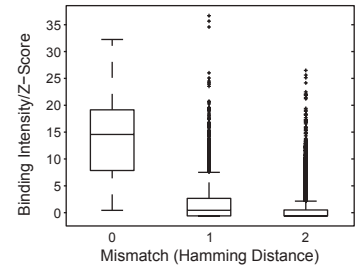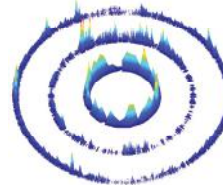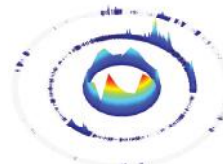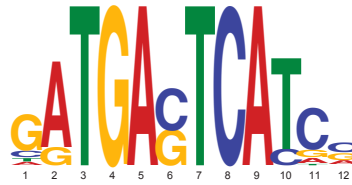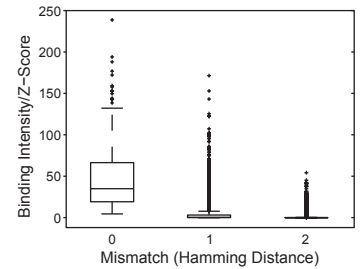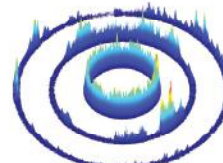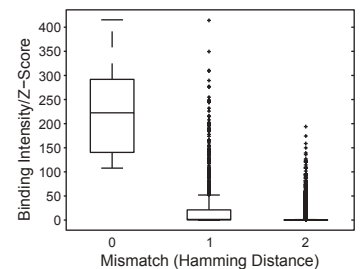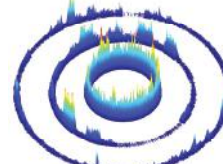
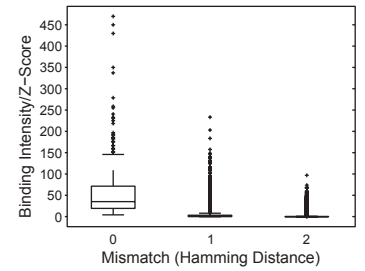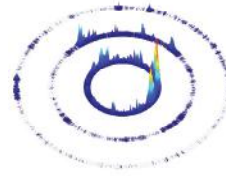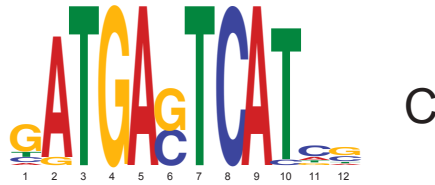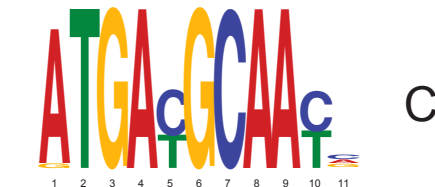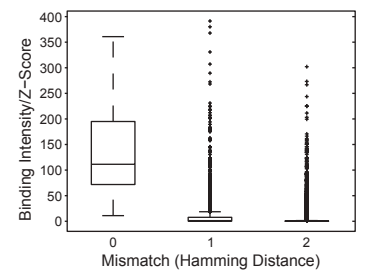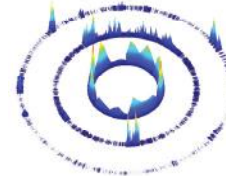| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.		Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
JUNB•BATF (<1 nM)		C	ATGAGTCAT	
JUNB•BATF2 (4 nM)		C	ATGAGTCAT	
JUNB•BATF2 (4 nM)		C	ATGACGTCAT	
JUNB•BATF3 (2 nM)		C	ATGAGTCAT	
JUNB•BATF3 (2 nM)		C, E	ATGACGTCAT	
JUNB•CEBPA (>5000 nM)		C	ATGACGCAAT	
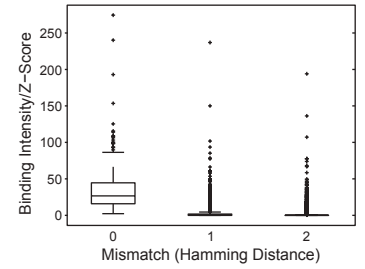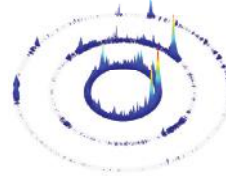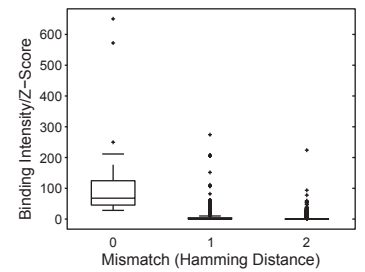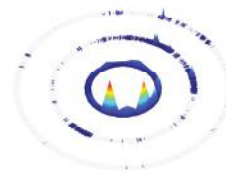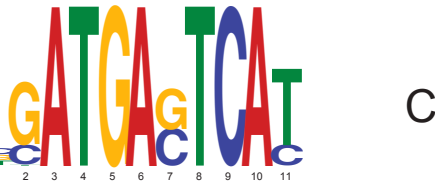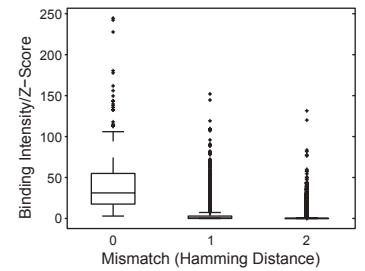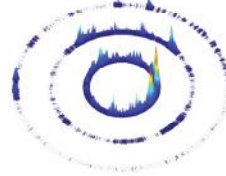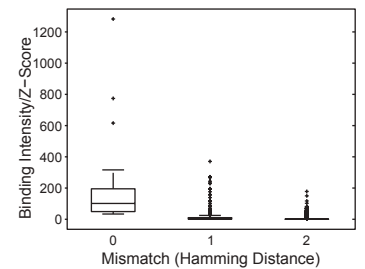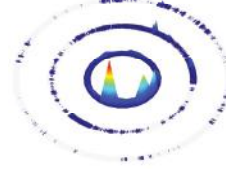
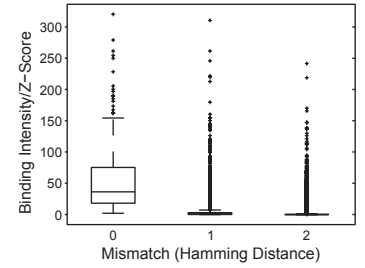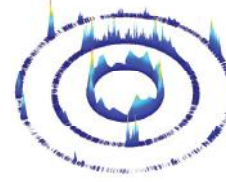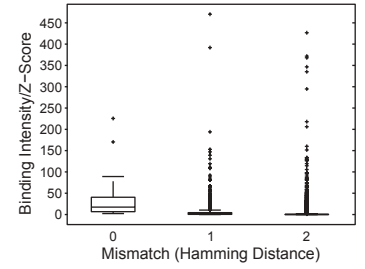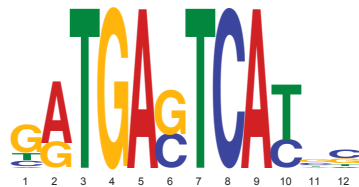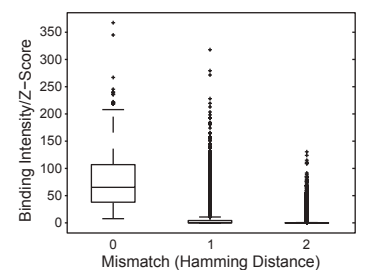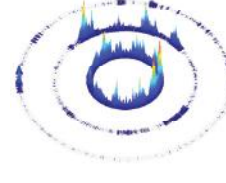| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.		Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
JUNB•CEBPE (1697 nM)		V	ATGACGCAAT	
JUNB•CEBPG (>5000 nM)		C	ATGACGCAAT	
JUNB•CREBZF (>5000 nM)		C	ATGAGTCAT	
JUNB•DBP (>5000 nM)		C	ATGACGTCAT	
JUNB•FOS (2 nM)		C	ATGAGTCAT	
JUNB•FOSL1 (5 nM)		C	ATGAGTCAT	
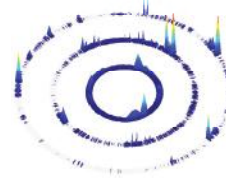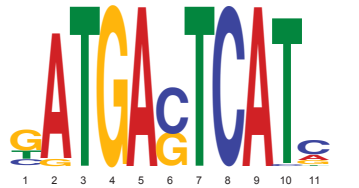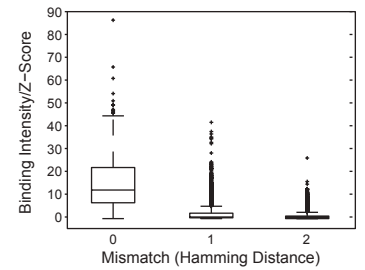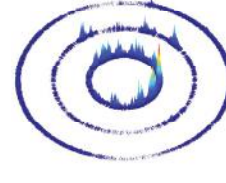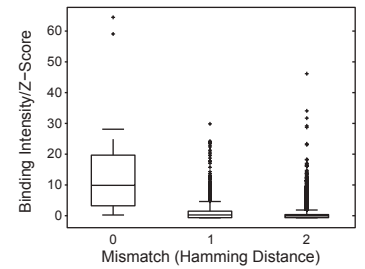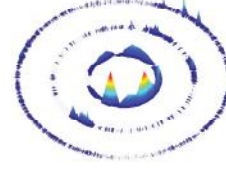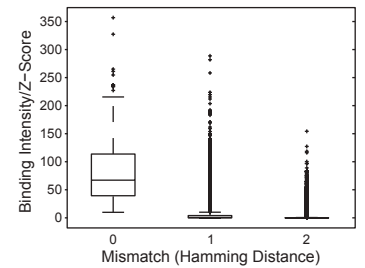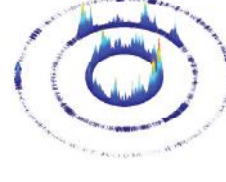
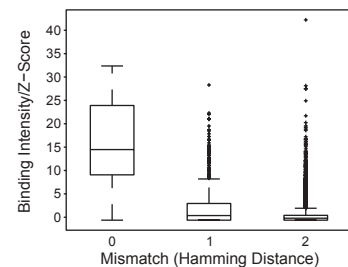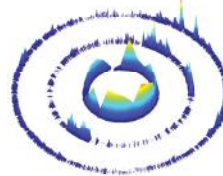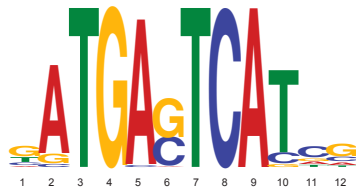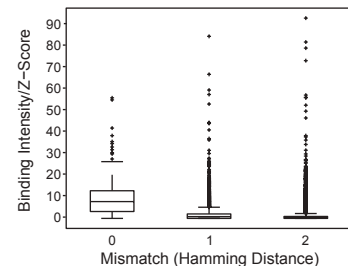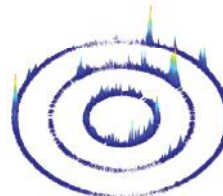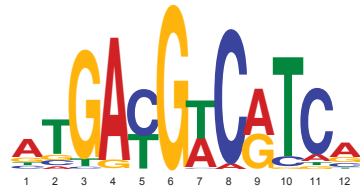| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.		Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
JUNB•HLF (>5000 nM)		C	ATGACGTCAT	
JUNB•JUN (>5000 nM)		C	ATGAGTCAT	
JUNB•JUN (>5000 nM)		C	ATGACGTCAT	
JUNB•NFE2 (>5000 nM)		C	ATGACGTCAT	
JUNB•NFE2 (>5000 nM)			ATGAGTCAT	
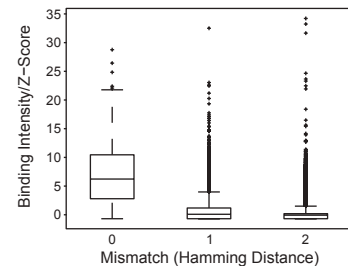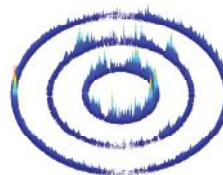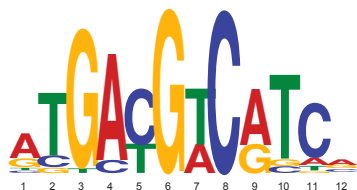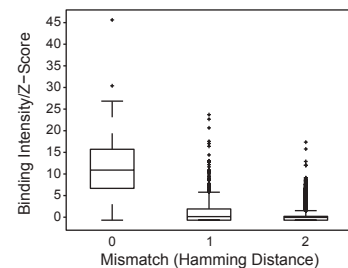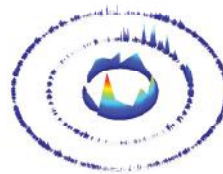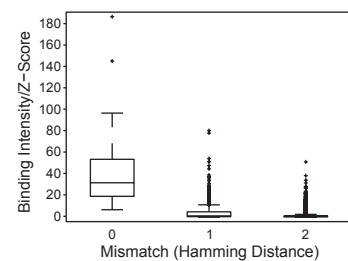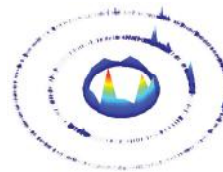
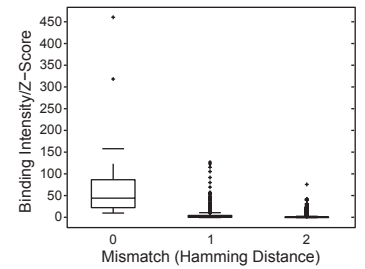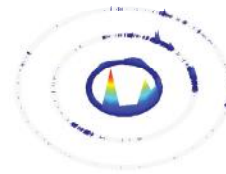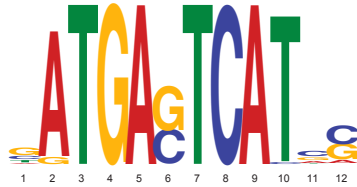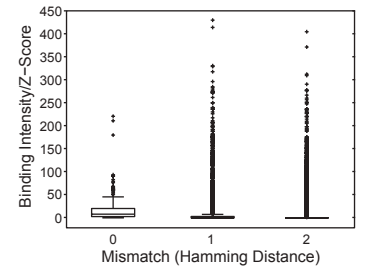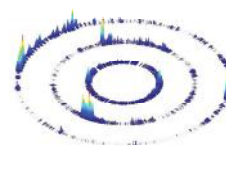| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.	Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
JUNB•NFE2L1 (>5000 nM)	C	ATGACGTCAT	
JUNB•NFE2L1 (>5000 nM)	C	ATGAGTCAT	
MAFB•ATF4 (193 nM)	C	TGCTGACGTCAT	
MAFB•ATF5 (>5000 nM)	C	TGCTGACGTCAT	
MAFB•ATF5 (>5000 nM)	C	TGCTGAGTCAT	
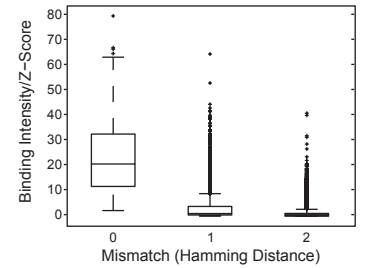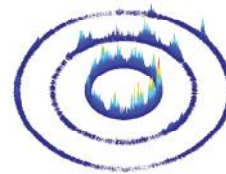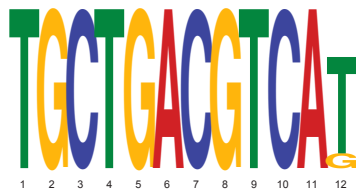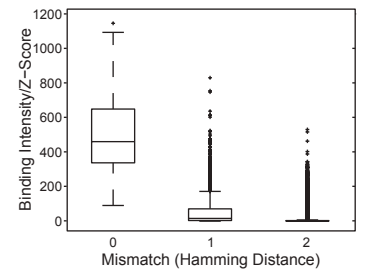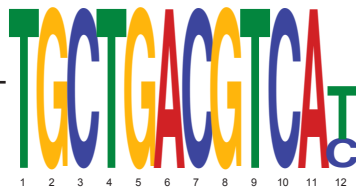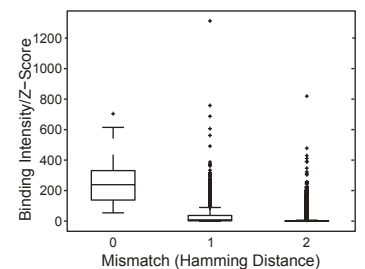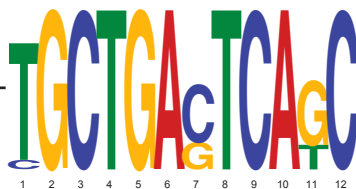
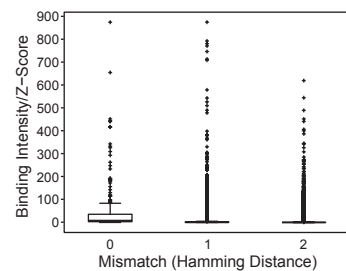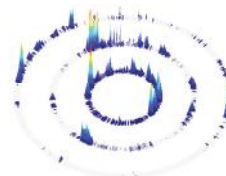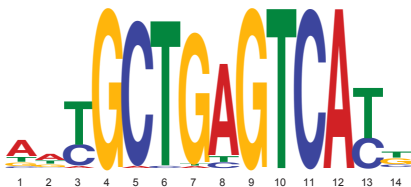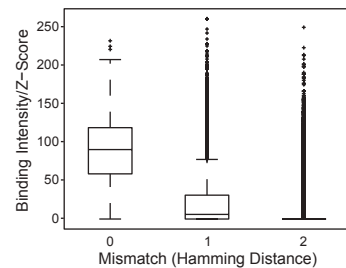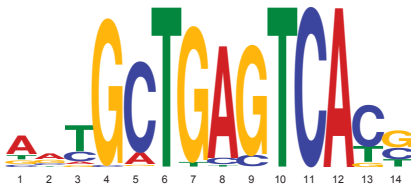| Heterodimer (PPI, Kd)	MEME motif and classification as (i) conjoined half-sites (C), (ii) conjoined half-site with a variable spacer (V), or as (iii) emergent (E) based on homodimer specificity.	Sequence Specificity & Energy Landscape (SEL)	Box plot for SEL rings
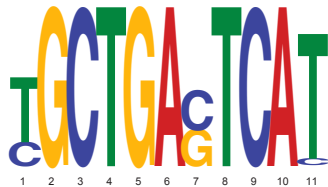
MAFB•FOSL1 (152 nM) — C — TGCTGAGTCAT

NFE2•MAFG (1340 nM) — C — TGCTGAGTCAT

NFE2L1•MAFG (<1 nM) — C — TGCTGAGTCAT