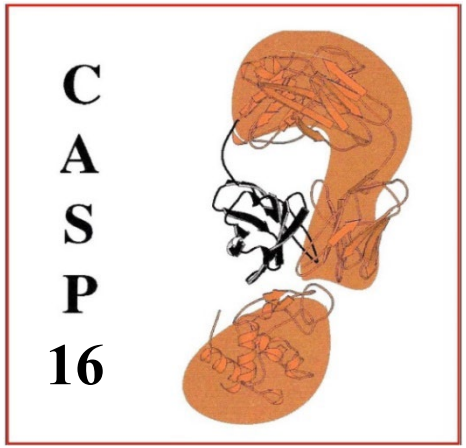
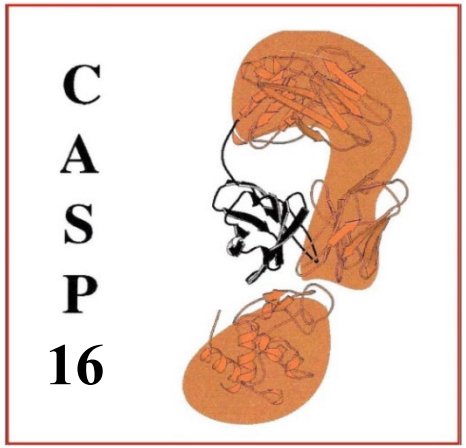


Andriy Kryshtafovych

Protein Structure Prediction Center
University of California, Davis
www.predictioncenter.org

Funded by the NIH/NIGMS

Anna
Tramontano

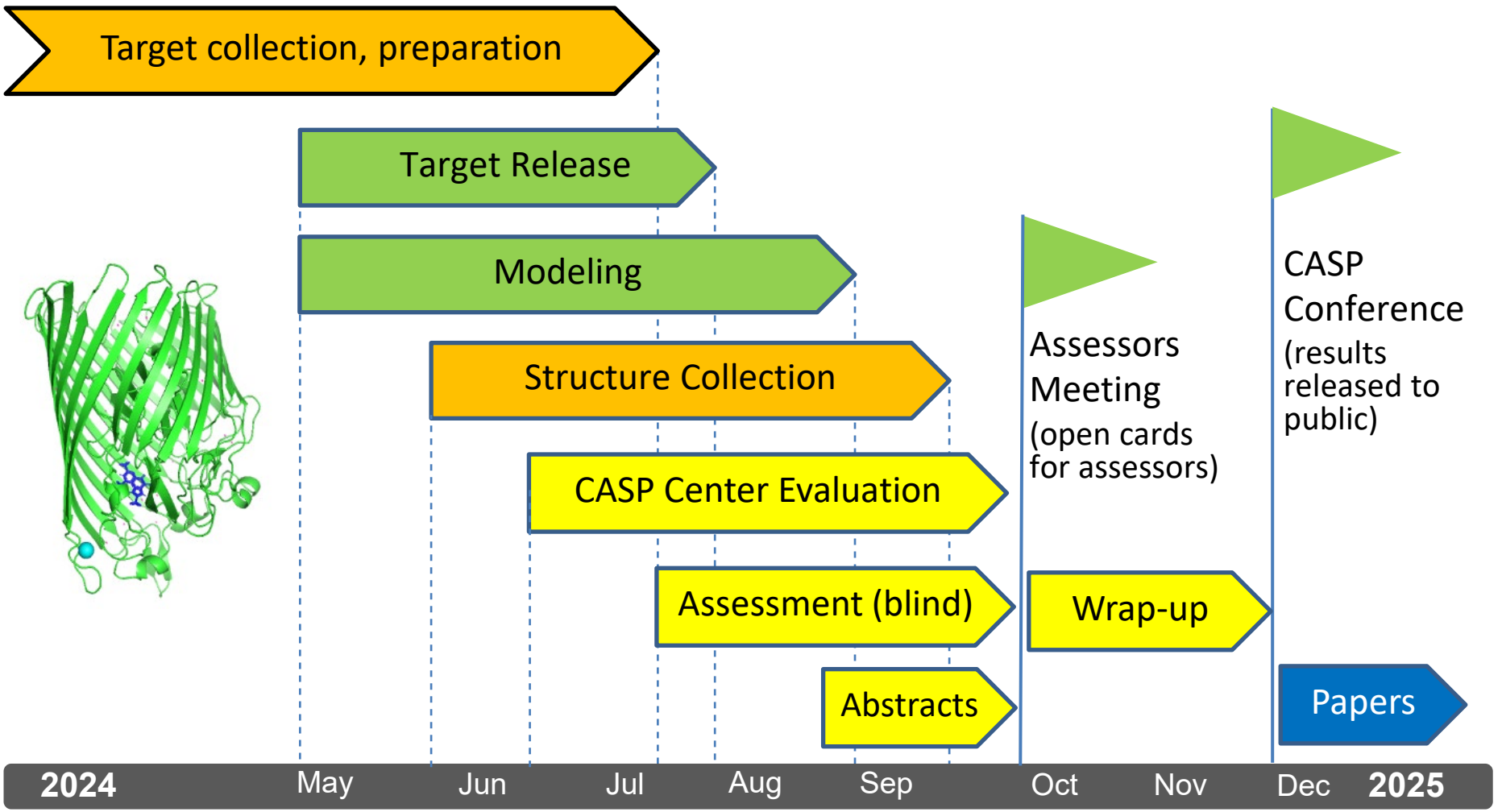


CASP16 participants predicted

over 1 billion

atoms cumulatively.

CASP Timeline



Target collection

56 *(48)* structure determination groups from 15 *(14)* countries

including

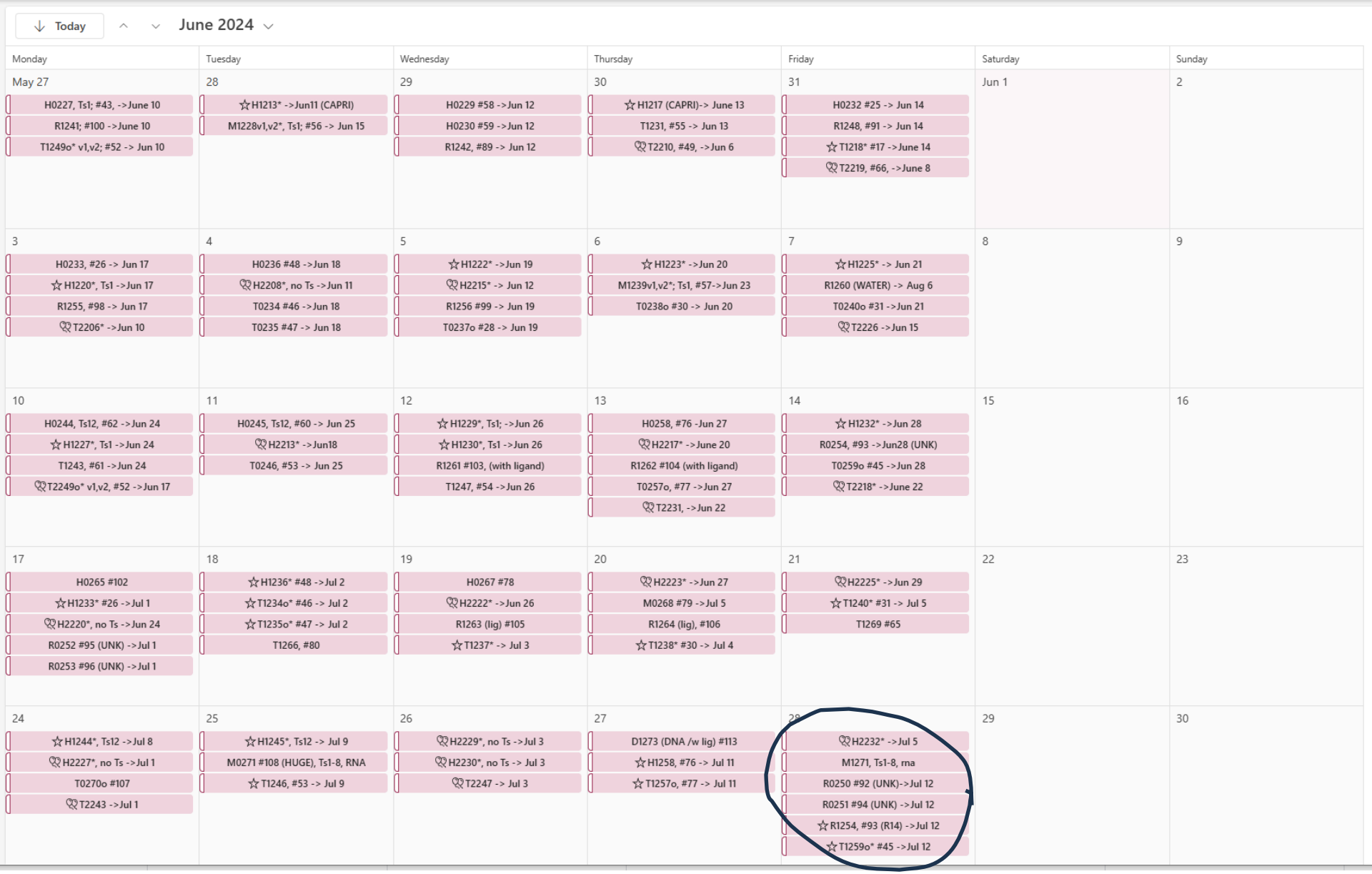
23 from the USA (46 targets) and 8 from the UK (16 targets)

New in CASP: 3-phase target release

- **Day 0,** 9:30am PDT - start of CASP **Phase 0** prediction without stoichiometry information (CASP targets T0xxx/H0xxx)
- Day +3, 9am - server prediction for Phase 0 ends
- Day +14, 9am - human prediction for Phase 0 ends
- **Day +14**, 9:30am - start of CASP/CAPRI **Phase 1** prediction with the stoichiometry info (CASP targets T1xxx/H1xxx)
- Day +17 , 9am - CASP server prediction for Phase 1 ends
- Day +17 - ColabFold models and MSAs are released. MSA for model_1 is used by predic ating **model_6** (human g
- Day +28,
- Day +28, shortly after 9am - the MassiveFold data (8040 models per target) are released
- **Day +28**, 9:30am - CASP/CAPRI **Phase 2** prediction starts with available MassiveFold models (CASP targets T2xxx/H2xxx)
- Day +28, 9:30am - CASP estimates of model accuracy round (EMA modes 1-3)
- **Day +31,** 9:00am - CASP EMA ends
- **Day +35,** 9:00am - CASP /CAPRI Phase 2 modeling ends

Thanks, Milot/Martin/Sergey and Guillaume/Marc!

Target release calendar (June 2024)



Today | June 2024

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
May 27 H0227, Ts1; #43, ->June 10 R1241; #100 ->June 10 T1249o* v1,v2; #52 -> Jun 10	28 ☆H1213* ->Jun11 (CAPRI) M1228v1,v2*, Ts1; #56 -> Jun 15	29 H0229 #58 ->Jun 12 H0230 #59 ->Jun 12 R1242, #89 -> Jun 12	30 ☆H1217 (CAPRI)-> June 13 T1231, #55 -> Jun 13 T2210, #49, ->Jun 6	31 H0232 #25 -> Jun 14 R1248, #91 -> Jun 14 ☆T1218* #17 ->June 14 T2219, #66, ->June 8	Jun 1	2
3 H0233, #26 -> Jun 17 ☆H1220*, Ts1 ->Jun 17 R1255, #98 -> Jun 17 T2206* ->Jun 10	4 H0236 #48 ->Jun 18 H2208*, no Ts ->Jun 11 T0234 #46 ->Jun 18 T0235 #47 -> Jun 18	5 ☆H1222* ->Jun 19 H2215* -> Jun 12 R1256 #99 -> Jun 19 T0237o #28 -> Jun 19	6 ☆H1223* ->Jun 20 M1239v1,v2*; Ts1, #57->Jun 23 T0238o #30 -> Jun 20	7 ☆H1225* -> Jun 21 R1260 (WATER) -> Aug 6 T0240o #31 ->Jun 21 T2226 ->Jun 15	8	9
10 H0244, Ts12, #62 ->Jun 24 ☆H1227*, Ts1 ->Jun 24 T1243, #61 ->Jun 24 T2249o* v1,v2, #52 ->Jun 17	11 H0245, Ts12, #60 -> Jun 25 H2213* ->Jun18 T0246, #53 -> Jun 25	12 ☆H1229*, Ts1; ->Jun 26 ☆H1230*, Ts1 ->Jun 26 R1261 #103, (with ligand) T1247, #54 ->Jun 26	13 H0258, #76 -Jun 27 H2217* ->June 20 R1262 #104 (with ligand) T0257o, #77 ->Jun 27 T2231, ->Jun 22	14 ☆H1232* ->Jun 28 R0254, #93 ->Jun28 (UNK) T0259o #45 ->Jun 28 T2218* ->June 22	15	16
17 H0265 #102 ☆H1233* #26 ->Jul 1 H2220*, no Ts ->Jun 24 R0252 #95 (UNK) ->Jul 1 R0253 #96 (UNK) ->Jul 1	18 ☆H1236* #48 ->Jul 2 ☆T1234o* #46 -> Jul 2 ☆T1235o* #47 -> Jul 2 T1266, #80	19 H0267 #78 H2222* ->Jun 26 R1263 (lig) #105 ☆T1237* -> Jul 3	20 H2223* ->Jun 27 M0268 #79 ->Jul 5 R1264 (lig), #106 ☆T1238* #30 -> Jul 4	21 H2225* ->Jun 29 ☆T1240* #31 -> Jul 5 T1269 #65	22	23
24 ☆H1244*, Ts12 ->Jul 8 H2227*, no Ts ->Jul 1 T0270o #107 T2243 ->Jul 1	25 ☆H1245*, Ts12 -> Jul 9 M0271 #108 (HUGE), Ts1-8, RNA ☆T1246, #53 -> Jul 9	26 H2229*, no Ts ->Jul 3 H2230*, no Ts -> Jul 3 T2247 -> Jul 3	27 D1273 (DNA /w lig) #113 ☆H1258, #76 -> Jul 11 ☆T1257o, #77 -> Jul 11	28 H2232* ->Jul 5 M1271, Ts1-8, rna R0250 #92 (UNK)->Jul 12 R0251 #94 (UNK) ->Jul 12 ☆R1254, #93 (R14) ->Jul 12 ☆T1259o* #45 ->Jul 12	29	30

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Target List csv

New targets are released at **9:30 am** Pacific time (PDT=GMT-7hours).
Targets expire at **9:00 am** PDT.

Predictions in the Ligand category should be submitted before the Ligand Deadline (typically 2 days before the Human Expiration) as submissions in this category will not be checked immediately upon acceptance, but only after all models are collected. If model(s) have formatting issues, you will get a message from us after the Ligand Deadline and will have a chance to resubmit models before the Human Expiration deadline.

Green color - active target; Yellow color - target expires within 48 hours; Orange color - target expires within 24 hours

RNA and Protein/RNA complexes are highlighted with the light grey background.

* CAPRI target

All targets | Mono/Homo -mers | Multimers | RNA | Ligand | Ensemble

Phase 0 | 1 | 2 | all (All targets) — Phase 0 | 1 | 2 | all (Mono/Homo -mers) — Phase 0 | 1 | 2 | all (Multimers) — Phase 0 | 1 | all (RNA)

#	Tar-id	Type	Res	Stoichiom.	Entry Date	Server Expiration	Ligand Deadline	Human Expiration	QA Prediction	Description
1.	T1201 *	Prot	210	A2	2024-05-01	2024-05-04	2024-05-15	2024-05-15	from: 2024-05-15 to: 2024-05-18	Q9GZX9 PDB code 8bwd
2.	H1202 *	Prot	190	A2B2	2024-05-02	2024-05-05	2024-05-16	2024-05-16	from: 2024-05-16 to: 2024-05-19	Q9GZX9_plus_P43026 PDB code 8bwl
3.	R1203	NucA /Ensmbl	134	R1	2024-05-02	2024-05-05	2024-05-14	2024-05-16	-	Rev response element stem-loop II PDB code 8uo6
4.	H1204 *	Prot	429	A2B2C2	2024-05-03	2024-05-06	2024-05-15	2024-05-17	from: 2024-05-17 to: 2024-05-20	Human hemoglobin in complex with nanobody
5.	L1000	Ligand	247	A1	2024-05-03	2024-07-19	2024-07-19	2024-08-02	-	Chymase
6.	L2000	Ligand	255	A1	2024-05-03	2024-07-18	2024-07-18	2024-08-01	-	Cathepsin G
7.	L3000	Ligand	846	A1	2024-05-03	2024-07-21	2024-07-21	2024-08-04	-	Autotaxin
8.	L4000	Ligand	306	A2	2024-05-03	2024-07-20	2024-07-20	2024-08-03	-	MPro
9.	R1205	NucA	59	R1	2024-05-03	2024-05-06	2024-05-17	2024-05-17	-	xrRNA
10.	T0206	Prot	237	UNK	2024-05-06	2024-05-09	2024-05-20	2024-05-20	-	Porcine astrovirus 4 capsid spike
11.	T1207	Prot	144	A1	2024-05-06	2024-05-09	2024-05-20	2024-05-20	Only MODEL2/QMODE3 from: 2024-05-20	Q9YLS4, 2A protein part of viral polyprotein

May 8, 2024 AF3 release:
thanks Arne Elofsson for the baseline predictions

293.										
294.	T1299	Prot	168	A1	2024-08-01	2024-08-04	2024-08-15	2024-08-15	MODEL2/QMODE3 from: 2024-08-15 to: 2024-08-18	9FJL PDB code 9fjl
295.	T2276	Prot	196	A1	2024-08-01	2024-08-04	2024-08-08	2024-08-08	-	One domain of A0A026WM60_OOCBI in complex with 33mer ssDNA
296.	L5001	Ligand	383	A1	2024-08-09	2024-08-28	2024-08-28	2024-08-28	-	WDR55_apo
297.	L5001v1	Ligand	383	A1	2024-08-30	2024-09-02	2024-09-18	2024-09-18	-	WDR55_apo
298.	R1261v1	NucA/Ligand	89	A1	2024-08-30	2024-09-02	2024-09-18	2024-09-18	-	ZTP riboswitch
299.	R1262v1	NucA/Ligand	89	A1	2024-08-30	2024-09-02	2024-09-18	2024-09-18	-	ZTP riboswitch with AICA
300.	R1263v1	NucA/Ligand	64	A1	2024-08-30	2024-09-02	2024-09-18	2024-09-18	-	ZTP riboswitch with m-1-pyridinyl AICA
301.	R1264v1	NucA/Ligand	64	A1	2024-08-30	2024-09-02	2024-09-18	2024-09-18	-	ZTP riboswitch with AICA derivative

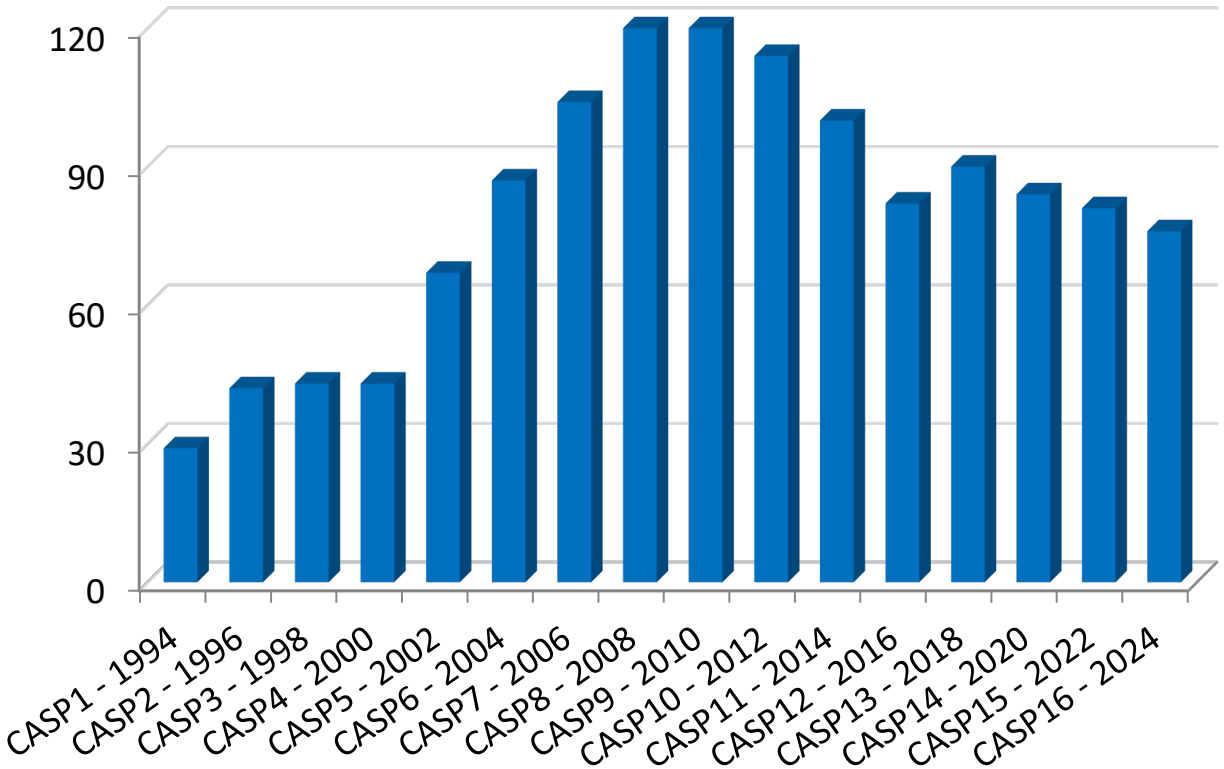
Cancelations

- 3 targets due to the lack of structure
- 2 targets due to preprints in public domain
- 2 stage0 targets due to wrong sequence provided and unintentional disclosure of stoichiometry

Re-releases

- 5 ligand targets due to the incorrect SMILES provided
- 2 filament targets (T1219 and T1269), for which practically no one paid attention that the targets were filaments

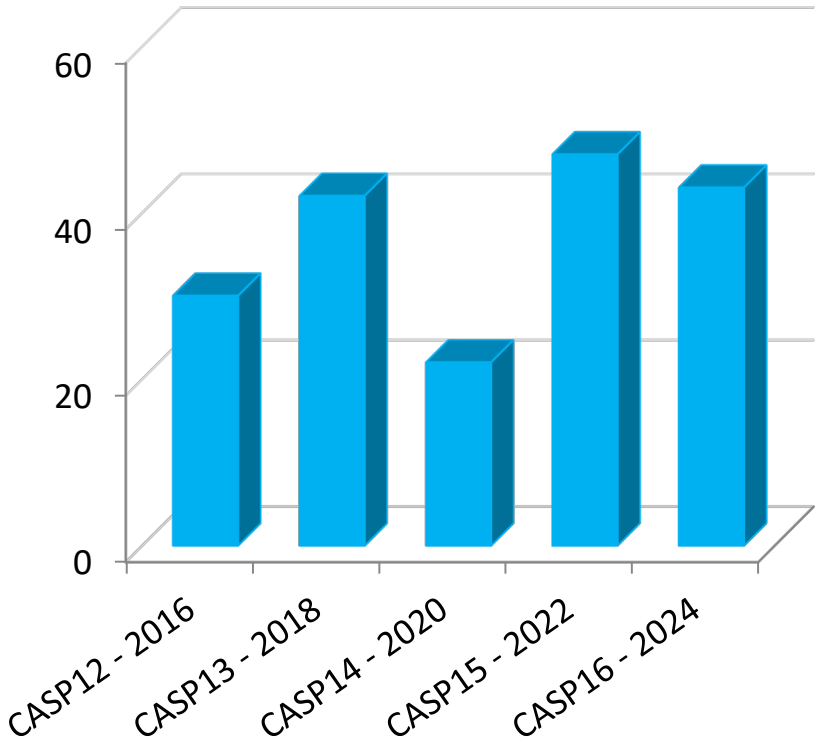
Historical CASP statistics on number of targets (TS)



CASP16 TS targets
(3 stages)

37 / **76** / 45

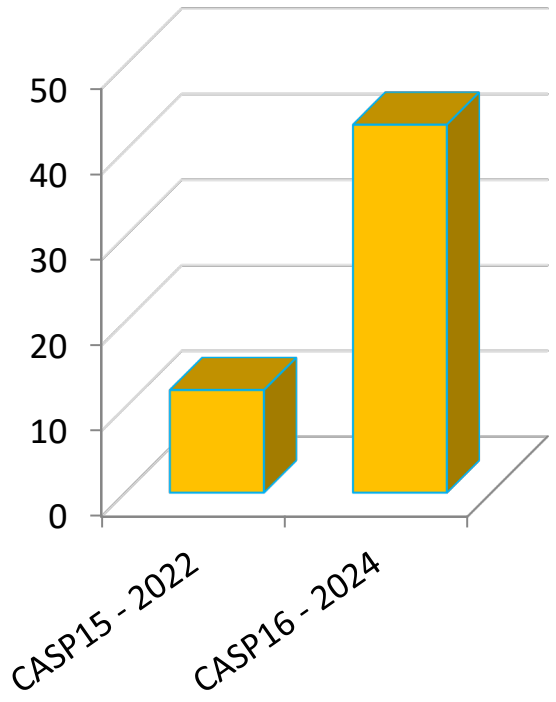
Historical CASP statistics on number of targets (QS)



CASP16 QS targets (3 stages):

30 / **43** / 35

Historical CASP statistics on number of targets (RNA)



CASP16 RNA targets:

52 (**43** unique)

including

32 monomers

and

20 multimers released in 2 stages (9/**11)**

New types of targets

RNA multimers, DNA, hybrids, pharma ligands (poses and affinity),
EMA on MassiveFold, RNA with water shell, ensemble domain-linker-domain

Category	Targets	Groups
RNA multimers	20	34
DNA targets	1	24
Hybrid complexes	22	56
LIGAND pharma pose	233 L[1-4]* (p)	34
LIGAND pharma affinity	140 L[1-4]*(a)	28
LIGAND pharma affinity - stage 2	110 L[1-4]*(pa)	27
MQA on MassiveFold	78	33
RNA with WATER shell	1 (R1260)	25
Ensemble (2 doms with a linker)	2 (T1200, T1300)	39

CASP in Gaeta, Italy 2004

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Developer Mailing List
The list for developers to hang out and where new features get proposed and discussed: openstructure-devel@maillist.unibas.ch.

The list is moderated for non-subscribed users and you are automatically subscribed once your first message is accepted. To unsubscribe from the list, write to openstructure-devel-leave@maillist.unibas.ch.

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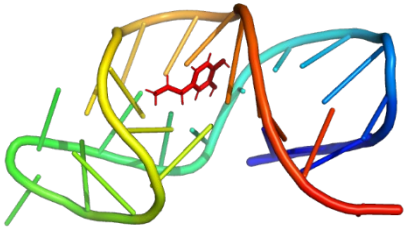
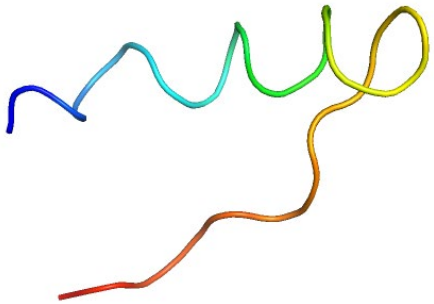
D1273



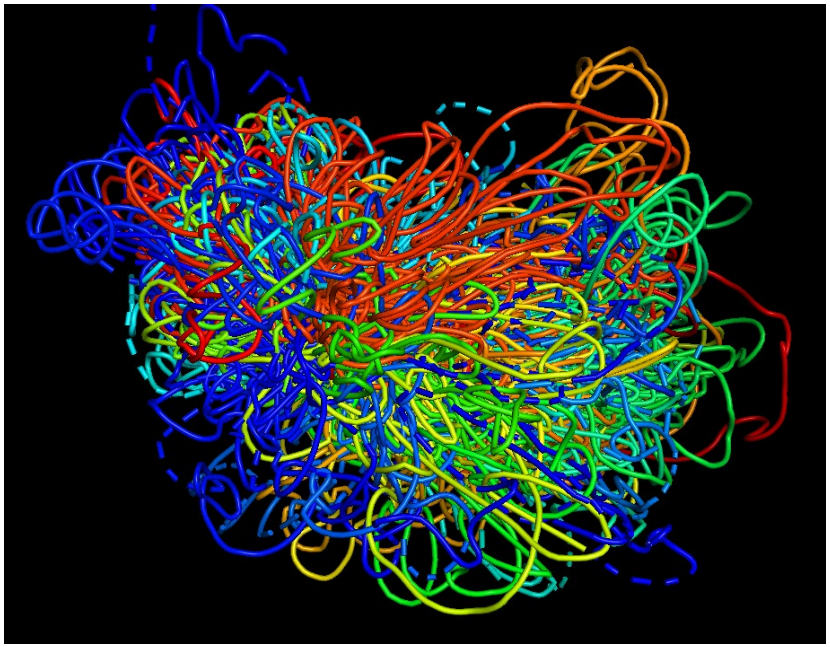


```
ATOM    132  N   THR 9  13      -0.486  -0.470   5.582  1.00 53.95           N
ATOM    133  H   THR 9  13      -0.062  -0.132   4.730  1.00 53.95           H
ATOM    134  CA  THR 9  13      -0.519   0.478   6.709  1.00 53.95           C
ATOM    135  HA  THR 9  13      -0.958  -0.024   7.571  1.00 53.95           H
ATOM    136  C   THR 9  13      -1.369   1.759   6.511  1.00 53.95           C
ATOM    137  CB  THR 9  13       0.912   0.854   7.097  1.00 53.95           C
ATOM    138  HB  THR 9  13       0.882   1.623   7.869  1.00 53.95           H
ATOM    139  O   THR 9  13      -1.571   2.471   7.491  1.00 53.95           O
ATOM    140  CG2 THR 9  13       1.707  -0.336   7.635  1.00 53.95           C
ATOM    141 HG21 THR 9  13       1.187  -0.764   8.493  1.00 53.95           H
ATOM    142 HG22 THR 9  13       2.692   0.004   7.955  1.00 53.95           H
ATOM    143 HG23 THR 9  13       1.824  -1.102   6.869  1.00 53.95           H
ATOM    144  OG1 THR 9  13       1.576   1.367   5.965  1.00 53.95           O
ATOM    145  HG1 THR 9  13       2.074   0.671   5.530  1.00 53.95           H
ATOM    146  N   CYS 9  14      -1.960   2.043   5.330  1.00 57.17           N
ATOM    147  H   CYS 9  14      -1.791   1.407   4.564  1.00 57.17           H
ATOM    148  CA  CYS 9  14      -3.002   3.080   5.155  1.00 57.17           C
ATOM    149  HA  CYS 9  14      -3.216   3.512   6.132  1.00 57.17           H
ATOM    150  C   CYS 9  14      -4.413   2.683   4.601  1.00 57.17           C
ATOM    151  CB  CYS 9  14      -2.390   4.205   4.313  1.00 57.17           C
ATOM    152  HB2 CYS 9  14      -2.226   3.859   3.292  1.00 57.17           H
ATOM    153  HB3 CYS 9  14      -3.081   5.048   4.291  1.00 57.17           H
ATOM    154  O   CYS 9  14      -5.314   3.514   4.658  1.00 57.17           O
ATOM    155  SG  CYS 9  14      -0.804   4.751   5.022  1.00 57.17           S
ATOM    156  HG  CYS 9  14      -1.050   4.364   6.277  1.00 57.17           H
ATOM    157  N   GLY 9  15      -4.691   1.475   4.093  1.00 54.15           N
ATOM    158  H   GLY 9  15      -3.954   0.785   4.107  1.00 54.15           H
ATOM    159  CA  GLY 9  15      -5.931   1.156   3.344  1.00 54.15           C
ATOM    160  HA2 GLY 9  15      -5.669   0.486   2.525  1.00 54.15           H
ATOM    161  HA3 GLY 9  15      -6.289   2.069   2.869  1.00 54.15           H
ATOM    162  C   GLY 9  15      -7.152   0.547   4.082  1.00 54.15           C
ATOM    163  O   GLY 9  15      -8.203   0.384   3.478  1.00 54.15           O
ATOM    164  N   CYS 9  16      -7.064  -0.221   5.170  1.00 54.89           N
ATOM    165  H   CYS 9  16      -6.136  -0.253   5.766  1.00 54.89           H
ATOM    166  CA  CYS 9  16      -8.167  -0.231   6.242  1.00 54.89           C
ATOM    167  HA  CYS 9  16      -9.124   0.102   5.840  1.00 54.89           H
ATOM    168  C   CYS 9  16      -7.953   0.437   7.605  1.00 54.89           C
ATOM    169  CB  CYS 9  16      -8.202  -1.772   6.397  1.00 54.89           C
ATOM    170  HB2 CYS 9  16      -7.242  -2.151   6.746  1.00 54.89           H
ATOM    171  HB3 CYS 9  16      -8.937  -2.023   7.162  1.00 54.89           H
ATOM    172  O   CYS 9  16      -7.490  -0.217   8.531  1.00 54.89           O
ATOM    173  SG  CYS 9  16      -8.682  -2.641   4.883  1.00 54.89           S
ATOM    174  HG  CYS 9  16      -7.797  -2.070   4.061  1.00 54.89           H
ATOM    175  N   ALA 9  17      -8.022   1.775   7.669  1.00 51.32           N
ATOM    176  H   ALA 9  17      -8.397   2.275   6.876  1.00 51.32           H
ATOM    177  CA  ALA 9  17      -7.282   2.550   8.684  1.00 51.32           C
ATOM    178  HA  ALA 9  17      -7.298   3.593   8.369  1.00 51.32           H
ATOM    179  C   ALA 9  17      -5.775   2.152   8.753  1.00 51.32           C
ATOM    180  CB  ALA 9  17      -8.028   2.471  10.031  1.00 51.32           C
ATOM    181  HB1 ALA 9  17      -7.557   3.143  10.748  1.00 51.32           H
ATOM    182  HB2 ALA 9  17      -7.986   1.458  10.431  1.00 51.32           H
ATOM    183  HB3 ALA 9  17      -9.069   2.765   9.900  1.00 51.32           H
ATOM    184  O   ALA 9  17      -5.131   2.316   9.783  1.00 51.32
```

Hi Andriy,

Here is my TS1 model for H1272. Since it is the largest model, it could be a problem with sendmail not handling so large email body. But it is strange that the manual upload using the web form doesn't seem to work either. I tried now using Firefox instead of Safari but no luck it seems.

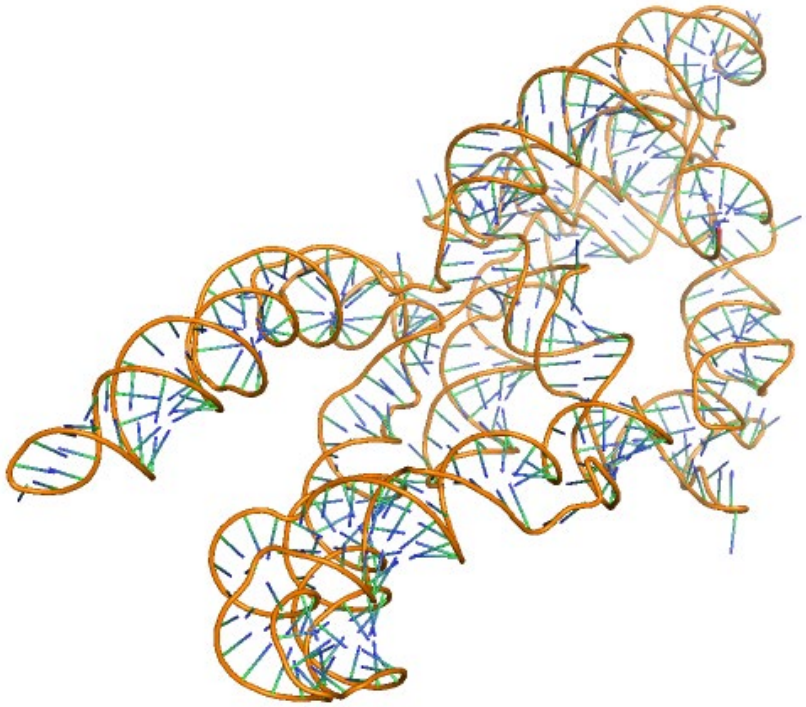
Oh my, xxxxx,
Did you take a look at your 'prediction'? It is horribly beautiful 😉. What software made that yarn ball?



It is the AlphaFold network (v1 model_3). It is known to produce clashes sometimes 😀. I actually didn't look at the model, since I run an automatic server, I only noticed in my logs that it wasn't accepted. I was actually surprised it produced anything at all considering the size.

I will see if I can produce something little bit less yarny…

#	Model	TM	DockQbest	Clashes
1.	R1252TS167_3o.pdb	0.218	0.350	1582
29.	R1252TS231_1o.pdb	0.134	0.736	541980



```
ATOM      1  P     G 0   1      35.158  -6.297 -51.583  1.00  0.00
ATOM      2  OP1   G 0   1      35.338  -5.374 -52.653  1.00  0.00
ATOM      3  OP2   G 0   1      34.213  -7.151 -51.301  1.00  0.00
ATOM      4  O5'   G 0   1      36.483  -6.348 -50.697  1.00  0.00
ATOM      5  C5'   G 0   1      36.824  -5.250 -49.881  1.00  0.00
ATOM      6  C4'   G 0   1      37.992  -5.590 -48.993  1.00  0.00
ATOM      7  O4'   G 0   1      37.662  -6.731 -48.164  1.00  0.00
ATOM      8  C3'   G 0   1      39.265  -6.019 -49.702  1.00  0.00
ATOM      9  O3'   G 0   1      40.018  -4.902 -50.180  1.00  0.00
.........................
ATOM      1  P     G 1   1      35.158  -6.297 -51.583  1.00  0.00
ATOM      2  OP1   G 1   1      35.338  -5.374 -52.653  1.00  0.00
ATOM      3  OP2   G 1   1      34.213  -7.151 -51.301  1.00  0.00
ATOM      4  O5'   G 1   1      36.483  -6.348 -50.697  1.00  0.00
ATOM      5  C5'   G 1   1      36.824  -5.250 -49.881  1.00  0.00
ATOM      6  C4'   G 1   1      37.992  -5.590 -48.993  1.00  0.00
ATOM      7  O4'   G 1   1      37.662  -6.731 -48.164  1.00  0.00
ATOM      8  C3'   G 1   1      39.265  -6.019 -49.702  1.00  0.00
ATOM      9  O3'   G 1   1      40.018  -4.902 -50.180  1.00  0.00
.........................
ATOM      1  P     G 2   1      35.158  -6.297 -51.583  1.00  0.00
ATOM      2  OP1   G 2   1      35.338  -5.374 -52.653  1.00  0.00
ATOM      3  OP2   G 2   1      34.213  -7.151 -51.301  1.00  0.00
ATOM      4  O5'   G 2   1      36.483  -6.348 -50.697  1.00  0.00
ATOM      5  C5'   G 2   1      36.824  -5.250 -49.881  1.00  0.00
ATOM      6  C4'   G 2   1      37.992  -5.590 -48.993  1.00  0.00
ATOM      7  O4'   G 2   1      37.662  -6.731 -48.164  1.00  0.00
ATOM      8  C3'   G 2   1      39.265  -6.019 -49.702  1.00  0.00
ATOM      9  O3'   G 2   1      40.018  -4.902 -50.180  1.00  0.00
.........................
```

CASP16 predictors geography

110 *(90)* prediction centers from 22 *(17)* countries,

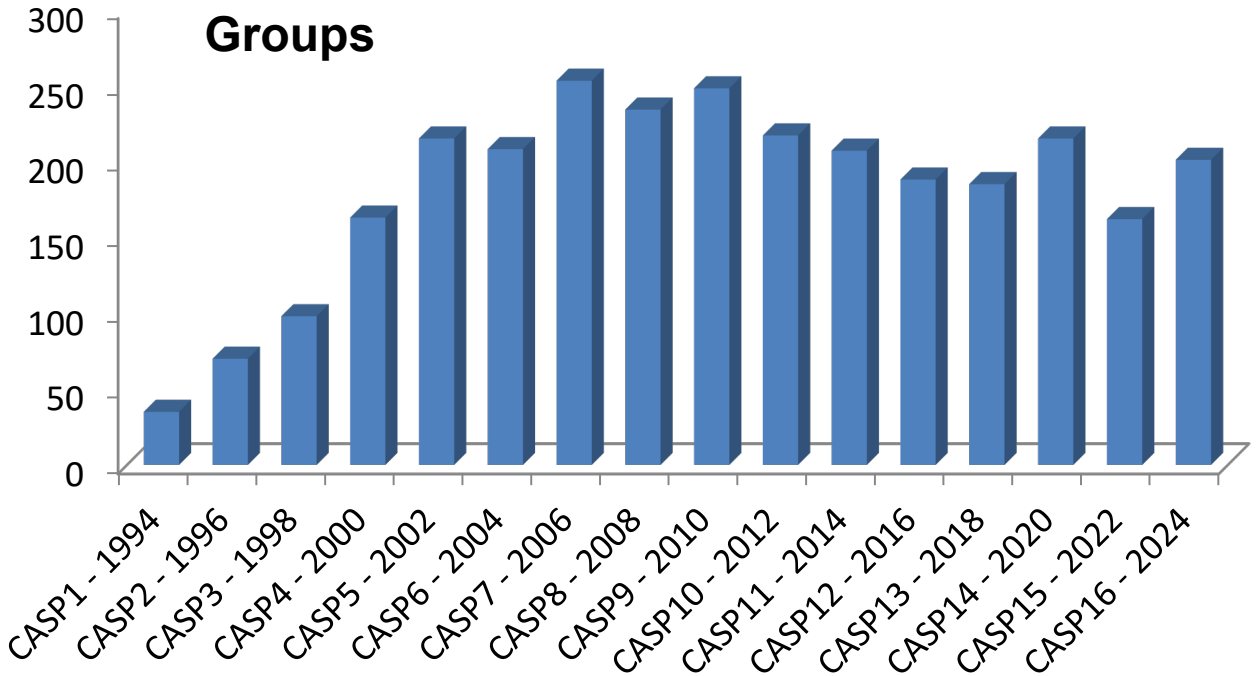
including

41 *(30)* from the USA (62 groups) and 30 *(29)* from China (56 groups)

200 groups from 110 research labs

Historical CASP statistics

on number of prediction groups



Detailed statistics

on number of groups per category

(left CASP16, right CASP15)

16th Community Wide Experiment on the Critical Assessment of Techniques for Protein Structure Prediction

CASP16 in numbers

Number of groups registered	**201**
including: *expert groups*	*153*
prediction servers	*48*
Number of protein tertiary structure prediction targets released (including:	**156**
Phase 0 subunits of multimers targets	*35*
Phase 1 targets	*76*
Phase 2 subunits of multimers targets)	*45*
Number of protein multimeric targets released	**108**
(including *Phase 0 /Phase 1 /Phase 2* targets)	*(30/43/35)*
Number of RNA targets released (monomers and multimers)	**52**
Number of multimeric RNA targets released	**20**
(including *Phase 0 /Phase 1* targets)	*(9/11)*
Number of hybrid (Protein/RNA/DNA) targets released	**22**
(including *Phase 0 /Phase 1* targets)	*(4/18)*
Number of incidental ligand targets released	**8**
Number of pharma pose ligand targets released	**233**
Number of pharma affinity ligand targets released	**140**
Number of pharma affinity ligand targets (stage 2) released	**110**
Number of RNA with water shell ensemble targets released	**1**
Number of protein A ensemble targets (disordered) released	**2**

Prediction category	Number of groups/servers contributing	Number of models designated as 1	Total number of submissions
Tertiary structure	125 / 36	9894	48183
Assembly (heteromeric)	85 / 31	4026	19711
Accuracy estimation	36 / 22	1243	3108
RNA	66 / 16	1786	8416
Hybrid complexes	56 / 19	561	2690
Incidental Ligands	23 / 1	192	893
Pharma Ligands (pose)	34	5983	27174
Pharma Ligands (affinity)	31	3509	15193
Pharma Ligands, stage 2 (affinity)	27	2691	2691
RNA with water shell	25	25	25
Protein A ensembles (disorder)	39	78	78
All (unique):	200 / 48	29987	128161

15th Community Wide Experiment on the Critical Assessment of Techniques for Protein Structure Prediction

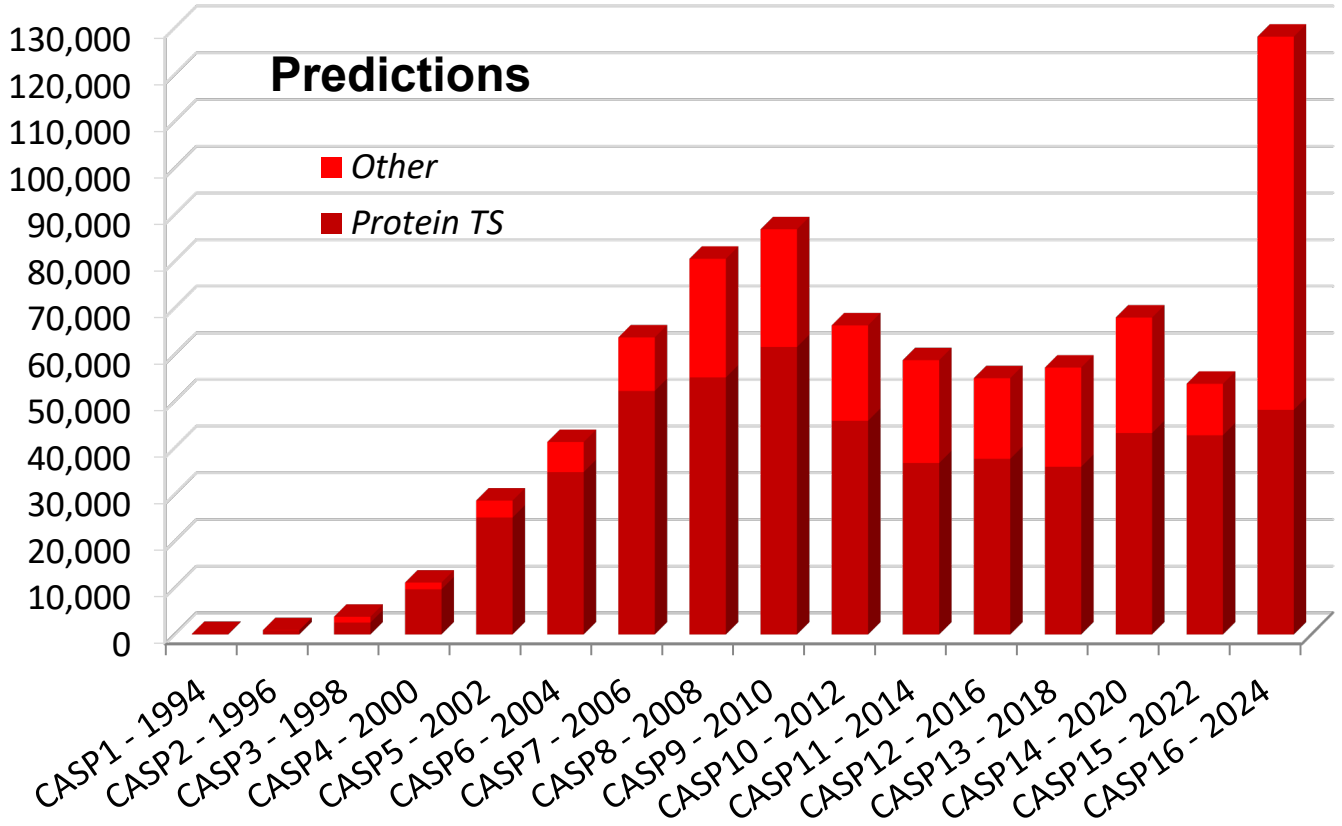
CASP15 in numbers

Number of groups registered	**165**
including: *expert groups*	*107*
prediction servers	*58*
Number of tertiary structure prediction targets released	**81**
Number of multimeric targets released	**47**
Number of RNA targets released	**12**
Number of ligand targets released	**23**

Prediction category	Number of groups/servers contributing	Number of models designated as 1	Total number of models
Tertiary structure	135 / 47	9143	42737
Assembly (heteromeric)	86 / 25	1261	5817
Accuracy estimation	26 / 17	1061	1061
RNA	42 / 9	388	1750
Ligand	33 / 5	573	2395
All (unique):	162 / 58	12430	53764

Historical CASP statistics

on number of predictions



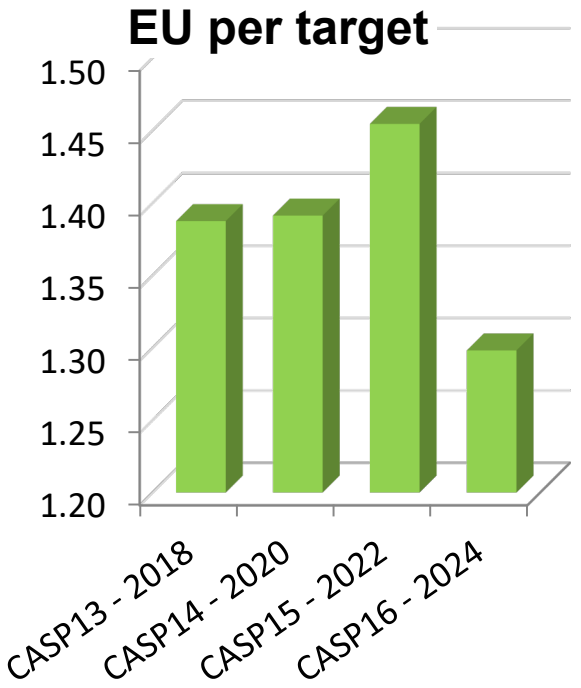
Structure collection progress

- Typically we have 40-50% of structures provided already during the target submission process. In CASP16 this number was only ~20%.
- From July 1 to August 1 we managed to secure almost 80% of targets, and by September this number grew up to ~95%.
- Our final target was received on Sep 15.

Domain definition

1. Pre-processed targets as soon as structures become available.
2. Run domain boundary definition programs (DDomain, DomainParser2, SWORD, ChainSaw).
3. Compare results of homology search programs (PSIBLAST, HHsearch) with #2.
4. Suggested preliminary domain definition based on #2, #3 and visual inspection.
5. Run evaluation of models and template search for the suggested domains.
6. Suggested composition of evaluation units (EUs) based on the domain-based evaluation results (Grishin plots) and, if needed,

   6.1. - rerun evaluation on the adjusted EUs (minimal number of exceptions).



Evaluation and CASP system

Reduced number of evaluation tools from 30+ in CASP15 to 20 in CASP16

Currently, CASP system includes ~20 visualization tools

Developed new infrastructure for:

- *accepting large files on a separate server*
- *evaluation and reporting results on RNA and RNA multimeric targets*
- *acceptance, evaluation and reporting results on DNA targets*
- *acceptance, evaluation and reporting results on hybrid targets*
- *acceptance, evaluation and reporting results on ligand targets*

*casp@predictioncenter:/data$ du -sh **
123G CASP12
214G CASP13
215G CASP14
391G CASP15
619G CASP16

THANKS