

## Supporting Information

Global T1	216.83	ns						
Global T2	1941.46	ns						
Global T3	4465.64	ns						
Global Chi	1.08							
Decay	Wavelen.	B1 Value	B1 overall	B2 Value	B2 overall	B3 Value	B3 overall	Chi Sq.
1.00	500.00	1716.24	0.98	38.89	0.02	1.18	0.00	1.73
2.00	520.00	526.39	0.93	24.82	0.04	11.91	0.02	1.16
3.00	540.00	197.33	0.58	92.26	0.27	47.89	0.14	1.00
4.00	560.00	184.92	0.24	396.64	0.51	198.43	0.25	1.02
5.00	580.00	241.87	0.13	1188.96	0.62	481.23	0.25	1.04
6.00	600.00	270.22	0.08	2429.49	0.71	733.49	0.21	1.03
7.00	620.00	191.46	0.04	3389.68	0.77	827.52	0.19	1.03
8.00	640.00	321.45	0.07	3562.00	0.77	765.80	0.16	1.05
9.00	660.00	207.60	0.05	3072.54	0.78	647.61	0.16	0.95
10.00	680.00	267.44	0.09	2240.30	0.74	533.56	0.18	1.11
11.00	700.00	190.74	0.09	1411.58	0.70	423.70	0.21	1.12
12.00	720.00	120.73	0.10	810.53	0.65	322.94	0.26	1.14
13.00	740.00	101.42	0.14	400.48	0.54	233.74	0.32	1.06
14.00	760.00	63.32	0.17	170.00	0.47	131.61	0.36	1.01
15.00	780.00	23.69	0.14	79.12	0.47	66.11	0.39	0.99
16.00	800.00	12.61	0.12	53.77	0.49	42.53	0.39	0.91

Table S1: decay associated spectra fluorescence lifetime data for BSA-AuNC at pH1.

Global T1	358.79	ns							
Global T2	2000.51	ns							
Global T3	4733.58	ns							
Global Chi	1.37								
Decay	Wavelen.	B1 Value	B1 overall	B2 Value	B2 overall	B3 Value	B3 overall	Chi Sq.	
1.00	500.00	1676.78	0.93	40.19	0.02	83.51	0.05	1.53	
2.00	520.00	501.07	0.73	77.15	0.11	111.76	0.16	1.15	
3.00	540.00	171.46	0.14	541.24	0.45	490.44	0.41	1.13	
4.00	560.00	354.73	0.08	2523.57	0.56	1636.40	0.36	1.09	
5.00	580.00	397.01	0.03	7787.95	0.67	3383.38	0.29	1.18	
6.00	600.00	518.88	0.02	16806.15	0.76	4836.47	0.22	1.42	
7.00	620.00	697.20	0.02	25390.04	0.81	5290.12	0.17	1.62	
8.00	640.00	1146.63	0.03	29506.72	0.83	4749.96	0.13	1.48	
9.00	660.00	2110.43	0.06	29111.25	0.83	4000.86	0.11	1.26	
10.00	680.00	3024.23	0.10	23617.89	0.80	3052.58	0.10	1.46	
11.00	700.00	2378.53	0.12	16048.18	0.78	2083.78	0.10	1.57	
12.00	720.00	1953.97	0.15	9388.65	0.74	1360.03	0.11	1.88	
13.00	740.00	1298.41	0.18	4905.11	0.70	829.68	0.12	1.54	
14.00	760.00	515.34	0.17	2033.85	0.69	408.95	0.14	1.32	
15.00	780.00	258.87	0.22	748.42	0.62	190.79	0.16	1.25	
16.00	800.00	91.71	0.15	425.82	0.68	108.21	0.17	0.97	

Table S2: decay associated spectra fluorescence lifetime data for BSA-AuNC at pH7.

Global T1	190.04	ns							
Global T2	1169.36	ns							
Global T3	2405.06	ns							
Global Chi	1.17								
Decay	Wavelen.	B1 Value	B1 overall	B2 Value	B2 overall	B3 Value	B3 overall	Chi Sq.	
1	500	1312.6	0.96	54.44	0.04	5.55	0	1.13	
2	520	500.49	0.91	33.19	0.06	13.71	0.03	1.1	
3	540	225.01	0.7	42.75	0.13	52.3	0.16	1.23	
4	560	199.71	0.33	164.81	0.27	241.45	0.4	1.15	
5	580	264.68	0.15	594.65	0.34	865.2	0.5	1.17	
6	600	301.14	0.07	1765.13	0.44	1965.35	0.49	1.04	
7	620	505.89	0.07	3474.49	0.48	3256.52	0.45	0.99	
8	640	267.64	0.03	5343.86	0.55	4151.24	0.43	1.28	
9	660	230.55	0.02	6619.92	0.6	4209.53	0.38	1.01	
10	680	347.14	0.03	6806.64	0.64	3513.46	0.33	1.01	
11	700	652.74	0.08	5433.4	0.63	2567.61	0.3	1.18	
12	720	506.16	0.08	4104.19	0.67	1500.16	0.25	1.11	
13	740	526.64	0.14	2554.91	0.67	758.61	0.2	1.12	
14	760	405.23	0.21	1187.22	0.61	351.09	0.18	0.93	
15	780	159.23	0.19	563.35	0.67	114.18	0.14	1.03	
16	800	111.01	0.24	294.63	0.65	50.9	0.11	1.04	

Table S3: decay associated spectra fluorescence lifetime data for BSA-AuNC at pH12.

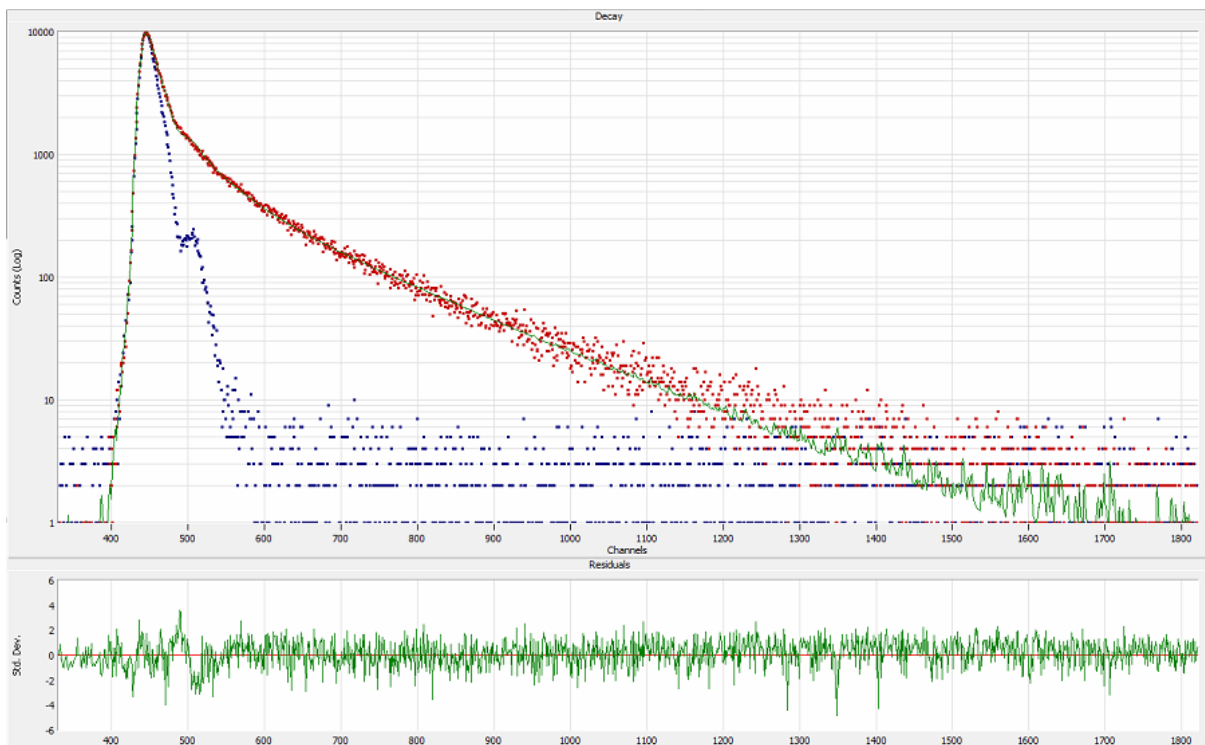


Fig. S1 Fluorescence decay of tryptophan in HSA (red) fitted with a 3 exponential model (green), and randomly distributed residuals showing a good fit (Chi Squared = 1.17).

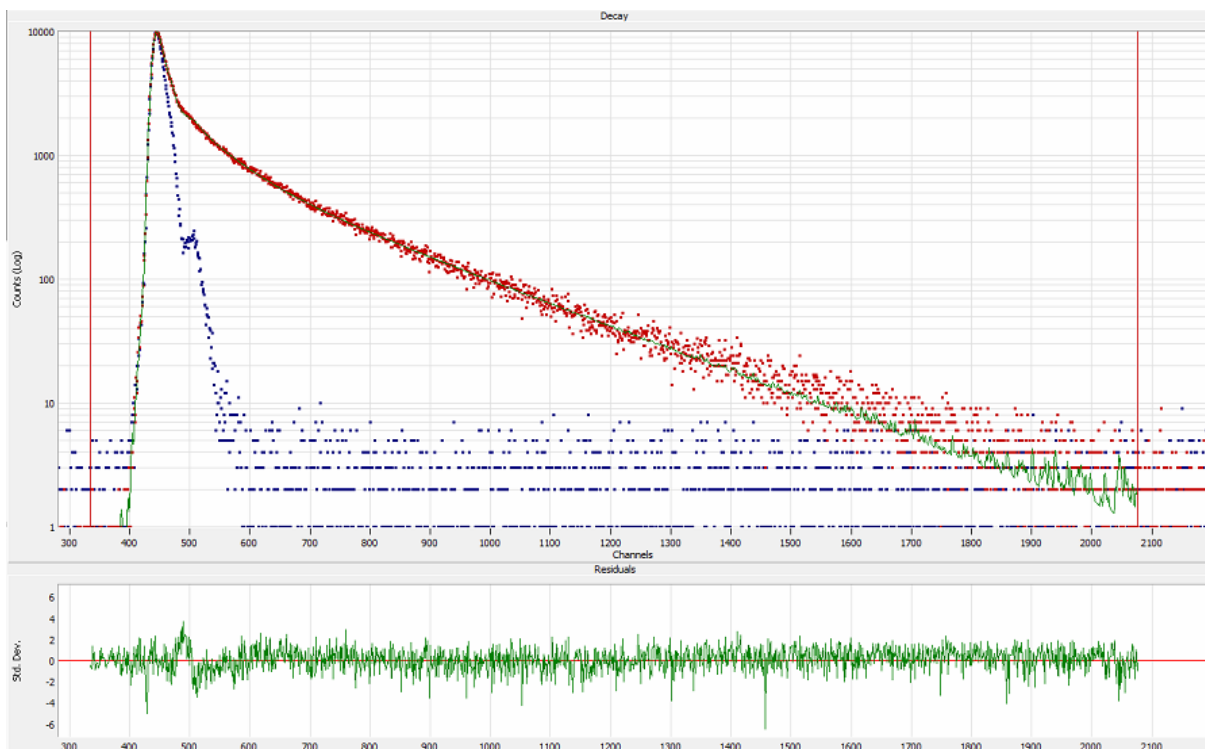


Fig. S2 Fluorescence decay of tryptophan in HSA-AuNC (red) fitted with a 3 exponential model (green), and randomly distributed residuals showing a good fit (Chi Squared = 1.21).