Summary of integrative structure determination of Integrative spatiotemporal modeling of biomolecular processes: application to the assembly of the Nuclear Pore Complex (PDB ID: 9A8T | pdb_00009a8t)

1. Model Composition	
1.1. Entry composition	- Nup133_spoke_1_yc_inner_cr: chain(s) A, J, S, AB, BK, BT, CC, CL, DU, ED, EM, EV, GE, GN, GW, HF, IO, IX, JG, JP, KY, LH, LQ, LZ, NI, NR, OA, OJ, PS, QB, QK, QT (639 residues) - Nup93_spoke_1_ir_core_1: chain(s) AK, AN, AQ, AT, CU, CX, DA, DD, FE, FH, FK, FN, HO, HR, HU, HX, JY, KB, KE, KH, MI, ML, MO, MR, OS, OV, OY, PB, RC, RF, RI, RL (815 residues) - Nup205_spoke_1_ir_core_1: chain(s) AL, AR, CV, DB, FF, FL, HP, HV, JZ, KF, MJ, MP, OT, OZ, RD, RJ (1684 residues) - Nup155_spoke_1_ir_core_1: chain(s) AM, AP, AS, AV, BI, BJ, CW, CZ, DC, DF, DS, DT, FG, FJ, FM, FP, GC, GD, HQ, HT, HW, HZ, IM, IN, KA, KD, KG, KJ, KW, KX, MK, MN, MQ, MT, NG, NH, OU, OX, PA, PD, PQ, PR, RE, RH, RK, RN, SA, SB (1356 residues) - Nup188_spoke_1_ir_core_2: chain(s) AO, AU, CY, DE, FI, FO, HS, HY, KC, KI, MM, MS, OW, PC, RG, RM (1564 residues) - p54_spoke_1_ir_chan_1: chain(s) AW, AZ, BC, BF, DG, DJ, DM, DP, FQ, FT, FW, FZ, IA, ID, IG, IJ, KK, KN, KQ, KT, MU, MX, NA, ND, PE, PH, PK, PN, RO, RR, RU, RX (366 residues) - p58_spoke_1_ir_chan_1: chain(s) AX, BA, BD, BG, DH, DK, DN, DQ, FR, FU, FX, GA, IB, IE, IH, IK, KL, KO, KR, KU, MV, MY, NB, NE, PF, PI, PL, PO, RP, RS, RV, RY (171 residues) - p62_spoke_1_ir_chan_1: chain(s) AY, BB, BE, BH, DI, DL, DO, DR, FS, FV, FY, GB, IC, IF, II, IL, KM, KP, KS, KV, MW, MZ, NC, NF, PG, PJ, PM, PP, RQ, RT, RW, RZ (169 residues) - Nup107_spoke_1_yc_inner_cr: chain(s) B, K, T, AC, BL, BU, CD, CM, DV, EE, EN, EW, GF, GO, GX, HG, IP, IY, JH, JQ, KZ, LI, LR, MA, NJ, NS, OB, OK, PT, QC, QL, QU (775 residues) - Nup96_spoke_1_yc_inner_cr: chain(s) C, L, U, AD, BM, BV, CE, CN, DW, EF, EO, EX, GG, GP, GY, HH, IQ, IZ, JI, JR, LA, LJ, LS, MB, NK, NT, OC, OL, PU, QD, QM, QV (475 residues) - SEC13_spoke_1_yc_inner_cr: chain(s) D, M, V, AE, BN, BW, CF, CO, DX, EG, EP, EY, GH, GQ, GZ, HI, IR, JA, JJ, JS, LB, LK, LT, MC, NL, NU, OD, OM, PV, QE, QN, QW (291 residues) - SEH1_spoke_1_yc_inner_cr: chain(s) E, N, W, AF, BO, BX, CG, CP, DY, EH, EQ, EZ, GI, GR, HA, HJ, IS, JB, JK, JT, LC, LL, LU, MD, NM, NV, OE, ON, PW, QF, QO, QX (322 residues) - Nup85_spoke_1_yc_inner_cr: chain(s) F, O, X, AG, BP, BY, CH, CQ, DZ, EI, ER, FA, GJ, GS, HB, HK, IT, JC, JL, JU, LD, LM, LV, ME, NN, NW, OF, OO, PX, QG, QP, QY (467 residues) - Nup43_spoke_1_yc_inner_cr: chain(s) G, P, Y, AH, BQ, BZ, CI, CR, EA, EJ, ES, FB, GK, GT, HC, HL, IU, JD, JM, JV, LE, LN, LW, MF, NO, NX, OG, OP, PY, QH, QQ, QZ (377 residues)

	- Nup160_spoke_1_yc_inner_cr: chain(s) H, Q, Z, AI, BR, CA, CJ, CS, EB, EK, ET, FC, GL, GU, HD, HM, IV, JE, JN, JW, LF, LO, LX, MG, NP, NY, OH, OQ, PZ, QI, QR, RA (1161 residues) - Nup37_spoke_1_yc_inner_cr: chain(s) I, R, AA, AJ, BS, CB, CK, CT, EC, EL, EU, FD, GM, GV, HE, HN, IW, JF, JO, JX, LG, LP, LY, MH, NQ, NZ, OI, OR, QA, QJ, QS, RB (318 residues)
1.2. Datasets used for modeling	- 3DEM volume, EMDB: EMD-3820 - Other, Other: idr0115 - Other, Zenodo: 10.5281/zenodo.11129725 - Experimental model, PDB: pdb_00005a9q - Experimental model, PDB: pdb_00005ijo - 3DEM volume, Zenodo: 10.5281/zenodo.11129725 - 3DEM volume, Zenodo: 10.5281/zenodo.11129725 - 3DEM volume, Zenodo: 10.5281/zenodo.11129725 - 3DEM volume, Zenodo: 10.5281/zenodo.11129725 - 3DEM volume, Zenodo: 10.5281/zenodo.11129725 - 3DEM volume, Zenodo: 10.5281/zenodo.11129725
2. Representation	
2.1. Number of representations	1
2.2. Scale	Multiscale: Coarse-grained: 1 - 10 residue(s) per bead
2.3. Number of rigid and flexible segments	496, 0
3. Restraints	
3.1. Physical principles	Information about physical principles was not provided
3.2. Experimental data	- 6 unique EM3DRestraint: None
4. Validation	
4.2. Number of ensembles	6
4.3. Number of models in ensembles	1121, 881, 801, 801, 1121, 801
4.4. Number of deposited models	6
4.5. Model precision	- 232.55, Å - 144.08, Å - 104.58, Å - 99.89, Å - 100.83, Å - 104.26, Å
4.6. Data quality	EMD-3820: resolution is Not available
4.7. Model quality: assessment of excluded volume	Satisfaction: 99.94-99.99%
4.8. Fit to data used for modeling	Fit of model to information used to compute it has not been determined

4.9. Fit to data used for validation	Fit of model to information not used to compute it has not been determined
5. Methodology and Software	
1. *5.1. Method name*	Monte Carlo sampling step 1. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	1600000
2. *5.1. Method name*	Choose the lowest scoring structure from each simulation.
5.2. Method type	Filtering
5.4. Number of computed models	200
3. *5.1. Method name*	Monte Carlo sampling step 2. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	320000
4. *5.1. Method name*	Choose the lowest scoring structure from each simulation.
5.2. Method type	Filtering
5.4. Number of computed models	200
5. *5.1. Method name*	Monte Carlo sampling step 3. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	320000
6. *5.1. Method name*	Choose the lowest scoring structure from each replica, and further filter by the median score.
5.2. Method type	Filtering
5.4. Number of computed models	801
7. *5.1. Method name*	Score trajectories based on the scores of snapshot models and the transitions between them.
5.2. Method type	Trajectory construction
8. *5.1. Method name*	Monte Carlo sampling step 1. Repeated for each snapshot model.
5.2. Method type	MC sampling

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9. *5.1. Method name*	Choose the lowest scoring structure from each simulation.
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5.4. Number of computed models	200
10. *5.1. Method name*	Monte Carlo sampling step 2. Repeated for each snapshot model.
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5.4. Number of computed models	320000
11. *5.1. Method name*	Choose the lowest scoring structure from each simulation.
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5.4. Number of computed models	200
12. *5.1. Method name*	Monte Carlo sampling step 3. Repeated for each snapshot model.
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5.4. Number of computed models	320000
13. *5.1. Method name*	Choose the lowest scoring structure from each replica, and further filter by the median score.
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5.4. Number of computed models	801
14. *5.1. Method name*	Score trajectories based on the scores of snapshot models and the transitions between them.
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15. *5.1. Method name*	Monte Carlo sampling step 1. Repeated for each snapshot model.
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5.4. Number of computed models	1600000
16. *5.1. Method name*	Choose the lowest scoring structure from each simulation.
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5.4. Number of computed models	200
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5.4. Number of computed models	320000
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5.2. Method type	Filtering
5.4. Number of computed models	200
19. 5.1. Method name	Monte Carlo sampling step 3. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	320000
20. 5.1. Method name	Choose the lowest scoring structure from each replica, and further filter by the median score.
5.2. Method type	Filtering
5.4. Number of computed models	801
21. 5.1. Method name	Score trajectories based on the scores of snapshot models and the transitions between them.
5.2. Method type	Trajectory construction
22. 5.1. Method name	Monte Carlo sampling step 1. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	1600000
23. 5.1. Method name	Choose the lowest scoring structure from each simulation.
5.2. Method type	Filtering
5.4. Number of computed models	200
24. 5.1. Method name	Monte Carlo sampling step 2. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	320000
25. 5.1. Method name	Choose the lowest scoring structure from each simulation.
5.2. Method type	Filtering
5.4. Number of computed models	200

26. *5.1. Method name*	Monte Carlo sampling step 3. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	320000
27. *5.1. Method name*	Choose the lowest scoring structure from each replica, and further filter by the median score.
5.2. Method type	Filtering
5.4. Number of computed models	801
28. *5.1. Method name*	Score trajectories based on the scores of snapshot models and the transitions between them.
5.2. Method type	Trajectory construction
29. *5.1. Method name*	Monte Carlo sampling step 1. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	1600000
30. *5.1. Method name*	Choose the lowest scoring structure from each simulation.
5.2. Method type	Filtering
5.4. Number of computed models	200
31. *5.1. Method name*	Monte Carlo sampling step 2. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	320000
32. *5.1. Method name*	Choose the lowest scoring structure from each simulation.
5.2. Method type	Filtering
5.4. Number of computed models	200
33. *5.1. Method name*	Monte Carlo sampling step 3. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	320000
34. *5.1. Method name*	Choose the lowest scoring structure from each replica, and further filter by the median score.

5.2. Method type	Filtering
5.4. Number of computed models	801
35. *5.1. Method name*	Score trajectories based on the scores of snapshot models and the transitions between them.
5.2. Method type	Trajectory construction
36. *5.1. Method name*	Monte Carlo sampling step 1. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	1600000
37. *5.1. Method name*	Choose the lowest scoring structure from each simulation.
5.2. Method type	Filtering
5.4. Number of computed models	200
38. *5.1. Method name*	Monte Carlo sampling step 2. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	320000
39. *5.1. Method name*	Choose the lowest scoring structure from each simulation.
5.2. Method type	Filtering
5.4. Number of computed models	200
40. *5.1. Method name*	Monte Carlo sampling step 3. Repeated for each snapshot model.
5.2. Method type	MC sampling
5.4. Number of computed models	320000
41. *5.1. Method name*	Choose the lowest scoring structure from each replica, and further filter by the median score.
5.2. Method type	Filtering
5.4. Number of computed models	801
42. *5.1. Method name*	Score trajectories based on the scores of snapshot models and the transitions between them.
5.2. Method type	Trajectory construction

5.5. Software	- gmconvert (version 2022/05/09) - Integrative Modeling Platform (IMP) (version 2.20)