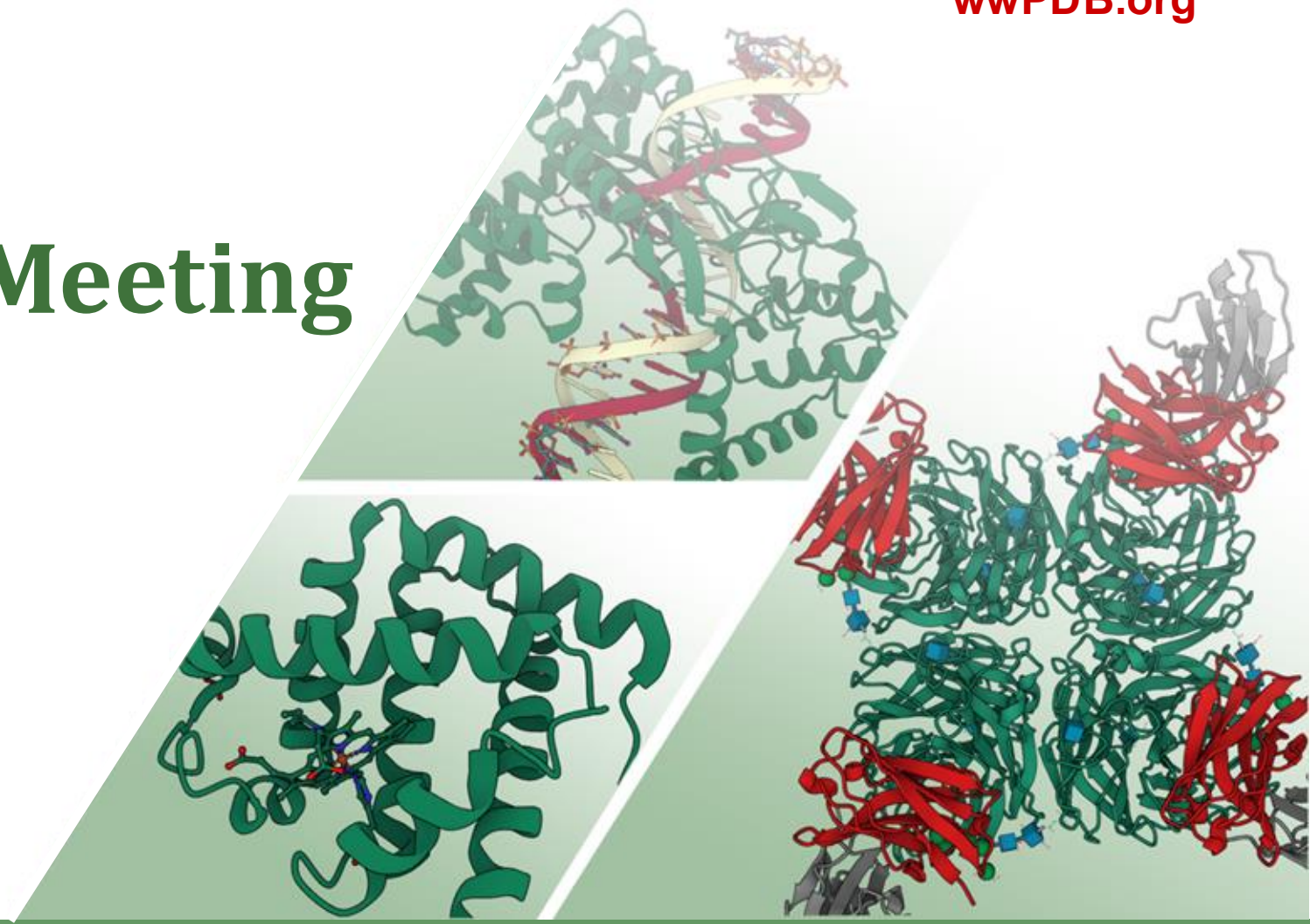
WORLDWIDE PDB
PROTEIN DATA BANK

wwPDB.org

2025 wwPDB AC Meeting

Friday, October 17, 2025
08:00 - 11:00 US (UTC+4)



Agenda

Time Zones						Session	Participants
US NJ/CT UTC-4	UK UTC+1	Europe UTC+2	India UTC+5:30	China UTC+8	Japan/Korea UTC+9		
8:00	13:00	14:00	17:30	20:00	21:00	Welcome and Introductions (10’)	All
8:10	13:10	14:10	17:40	20:10	21:10	Executive Session No. 1 (20’)	AC
8:30	13:30	14:30	18:00	20:30	21:30	Discussion/Questions for AC (60’)	All
9:30	14:30	15:30	19:00	21:30	22:30	Executive Session No. 2 (45’)	AC
10:15	15:15	16:15	19:45	22:15	23:15	Feedback to Leadership (30’)	All
10:45	15:45	16:45	20:15	22:45	23:45	Acknowledgements (10’)	All
10:55	15:55	16:55	20:25	22:55	23:55	Group Photo/Meeting Close (5’)	All
11:00	16:00	17:00	20:30	23:00	24:00	End	

Welcome and Introductions

Jeff Hoch, BMRB

Discuss questions/answers/ any other issues

Executive Session

Host (BMRB) will add Advisors into Zoom Breakout Room

Please re-join us at the end of your discussion by selecting
Leave the breakroom (lower right hand corner)

Request for Advisor Feedback

1. Concerns re the future of wwPDB member funding have not eased in the past twelve months.

   Is the wwPDB AC willing to reaffirm publicly the importance of open access to scientific research data and the enormous value of the wwPDB Core Archives?

   - **Would the AC publish a communication in a respected journal that wwPDB can share with funders and other government officials?**

2. A long-term aspirational goal of the wwPDB is to establish a common global instance (with failover) of the OneDep software system for structure deposition, validation, and biocuration to avoid challenges with maintaining multiple instances in different geographic locations with differing hardware and operating system configurations (see Slide No. 14).

   Is the wwPDB AC aware of other organizations that have tackled similar challenges that we could learn from?

3. The AC will learn about the successful and pending joint BBSRC-NSF (see Slide No. 32) grants for deposition and validation, respectively.

   - **Is the AC aware of other joint funding mechanisms?**
   - **What areas should wwPDB target for future joint submissions?**

1. Funding Update - wwPDB Core Members

- RCSB PDB: NSF, NIH, DOE (2024-2028)
- BMRB: NIH R24 (2023- June 2028) , NIH R35 (2025- July 2030)
- PDBe: EMBL-EBI, Wellcome Trust (2021- May 2026)
  - Will move to Wellcome trust funding to EMBL-EBI from May 2026 - April 2029
- PDBj: JST-NBDC, AMED-BINDS (2022-March 2027)
  - Additional budget from S. Korea for Data-out (2025-2026)
- EMDB: EMBL-EBI, Wellcome Trust (Jan 2025-December 2027)
- RCSB PDB/PDBe: Joint NSF/BBCRC Project No. 2 - Mol* Visualization
  - RCSB PDB Completed November 2024
  - PDBe until the end of December 2025
- RCSB PDB/PDBe: Joint NSF/BBCRC Project No. 4 - Deposition Automation
  - RCSB PDB through August 2028
  - PDBe/EMDB through October 2028

1. Funding Update - wwPDB Associate Member

Basic support for PDB China (basic PDBc data-in and data-out operations) is provided by guaranteed funds for NFPS. “Data-base and Computation” for protein science, with approved support for 9 FTEs (personnel), is one of these nine technical systems in NFPS. For the current funding period (years 2025.9-2028.9), this basic yearly grant for NFPS is CNY 55,670,000 (~USD $7,852 k/year). On top of this basic grant, NFPS also receive 0-15% merit-based bonus operation fund every year, and have supplementary salary support for personnel from the Chinese Academy of Sciences (CAS).

Pending Grant 1: To support the research program of PDB China, we have applied for the National Key Research and Development Program of China. The estimated funding is approximately CNY 24,000,000 (~USD $ 3,369 k) for years 2026-2030.

Pending Grant 2: In addition, we have also applied for the Special Program of Scientific and Technological Basic Resources Investigation, for “Compilation of Biological Structural Data and Databank Construction ”. The estimated funding for PDBc is approximately CNY 2,420,000 (~USD $ 340 k) for years 2026-2030.

1. Funding Issues

- Current funding is constrained to support of Operations at all wwPDB Core Member sites
- Very few funding calls to support development of new services or software tools (Joint NSF/BBSRC mechanism is a notable exception)
- Time between application to receipt of funds/starting work can be one or more years (difficult to keep up with pace of change)
- There are essentially no funding calls to address technical debt (*e.g.*, refactoring of OneDep) and necessary infrastructure updates (*e.g.*, operating system changes, new hardware needs)
- US federal funding uncertainties could persist for years

Discussion/Feedback

2. Future of OneDep Development

- Complexity of depositions to OneDep continues to increase
  - Number of new structures increasing (‘25 proj. 21060 *vs*. 19118 in ‘24)
  - Average structure is getting more challenging to process
  - Average structure contains more polymer and ligand components
  - Experimental methods becoming more complex (3DEM, XFEL, *etc*.)
  - Scope of Investigations broadening (dynamics, screening, *in-situ* 3DEM, *etc*.)
  - Structure validation challenges remain (3DEM, IHM, fragments, dynamics)

- Recent advances and work in progress
  - Containerization identified as an essential technical goal
  - Process of continual improvement of user experience
  - Ongoing collaboration with software developers
  - Workshop on Bayesian validation scheduled for 10/18-19/2025
  - New joint NSF/BBSRC grant submission under review to support improved validation carried out as part of structure determination/refinement

2. Future of OneDep Development (cont.)

- Streamline data deposition to OneDep
  - Reduce data entry burden by coordinating software development that supports automated harvesting and uploads from data collection facilities and structure-determination software providers as nearly complete PDBx/mmCIF format files
  - Enable parallel deposition of related structures, experimental data, metadata as Investigations (building on GroupDep experience)

- Streamlining structure biocuration
  - Incorporate AI/ML-based methods into OneDep
    - Validation: Better detection of outliers, anomalies, inconsistencies, *etc*.
    - Biocuration: Increase efficiency of wwPDB annotators
      - Example: Using natural language processing of deposited metadata to automatically connect PDB structures to publications appearing after release (PDB archive would be the training set)

2. Future of OneDep Development (cont.)

- Software infrastructure challenges
  - Technical debt needs to be addressed, while continuing to fix bugs and make user required/requested improvements
  - Need to make our software more modular and more maintainable
  - Move to Cloud Computing: opportunities *vs*. challenges
  - Operating system evolution/migration is repeatedly diverting efforts away from maintenance and refactoring
- Hardware infrastructure challenges
  - Currently operating and maintaining four instances of OneDep (PDBj, PDBc@PDBj, RCSB PDB, PDBe)
  - Long-term Goal: Single scalable OneDep instance that supports all of wwPDB (divide-and-conquer software management, centralized system management, warm failover, flexible machine provisioning, long lease)

Discussion/Feedback

3. PDBc Status Report

- Report on progress towards 100%
  - Statistics of entries from Mainland China annotated in Shanghai

	Total	XRAY	EM (m+m)	EM (model)	EM (map)	NMR (l+s)	PDBc	Percentage
2024-Jul	409	149	177	0	82	1	285	69.9
2024-Aug	349	141	198	0	53	2	322	81.7
2024-Sep	458	148	249	1	55	5	378	82.5
2024-Oct	576	185	338	2	45	6(4+2)	453	78.6
2024-Nov	403	175	189	0	29	10(8+2)	337	83.6
2024-Dec	436	192	194	5	41	4(3+1)	415	95.2
2025-Jan	540	215	263	1	58	3	496	91.9
2025-Feb	278	96	136	5	39	1	241	86.7
2025-Mar	449	183	218	1	40	6	421	93.8
2025-Apr	498	139	252	3	100	4	454	91.2
2025-May	517	173	262	1	77	4	479	92.6
2025-Jun	359	131	163	1	57	7	353	98.3
2025-Jul	537	193	227	7	109	1	537	100

3. Transition to Core Membership

- Commitment/timeline re processing of incoming depositions
  - 100% coverage of depositions from Mainland China (currently ~100%)
  - Development of new function that enable depositors in Hong Kong/Taiwan to choose PDBc or PDBj
  - Installation of OneDep deposition server for PDBc@Osaka (ongoing)
  - Installation of OneDep annotation training server for PDBc@Shanghai
  - Meeting participation at wwPDB Lead Biocurator meeting and wwPDB Summit
- Progress on non-annotation activities
  - Testing new releases of updated OneDep software (underway)
  - Assistance with problems during the deposition process (ongoing)
  - OneDep software release and update of PDBc training server at Shanghai (ongoing)
  - Full maintenance of PDBc servers at Osaka (currently pending training, scheduled in April 2026)
  - Supporting OneDep software development (currently pending additional funding)

3. Transition to Core Membership (cont.)

- Commitment/timeline re protections for data security/privacy
  - wwPDB-specific requirements for data security and privacy to be codified
  - Going forward wwPDB sites will document completion of research ethics training by each team member on an annual basis.

- Commitment/timeline re contributions to OneDep operations
  - Trusted weekly data transfer to the wwPDB Core Archive Keepers
  - Globus based data transfer to/from P.R.C.

3. Transition to Core Membership (cont.)

The wwPDB Charter states :

“A wwPDB Associate Member may be invited to apply to become a wwPDB Core Member, following successful completion of a term of no less than five years as a wwPDB Associate Member, with evidence of sufficient technical expertise, adequate infrastructure, and sustainable funding”

- After becoming a Core Member, PDBc will
  - Install a OneDep production server at Shanghai
  - PDBj will transfer all data remotely processed by PDBc to Shanghai

Discussion/Feedback

4. wwPDB Policies re Obsoleting Entries

Problem Statement

- Three wwPDB Core Archives have differing policies governing removal (Obsoleting) of entries in unusual circumstances (e.g., fraud)

Progress

- AC review of draft common policy (done)
- wwPDB legal review of revised draft common policy (pending resolution of outstanding Deb Kelly issues)
- Public Notice/60-Day Comment Period community review of further revised draft common policy (to be actioned)
- Finalize and promulgate new wwPDB Common Obsolete Policy (to be actioned)

4. Draft wwPDB Policy re Obsoleting Entries

DRAFT 09/21/2024
Common Policy for Obsoleting wwPDB Core Archive Entries

Entry Removal in Unusual Circumstances

Circumstances may arise in which the integrity, correctness, ownership, or provenance of data deposited as part of a wwPDB Core Archive Entry (*i.e.*, experimental data and related metadata and/or atomic coordinates for a three-dimensional structure of a biomolecule with an issued BMRB, EMDB, or PDB ID) are called into question.

In such circumstances, the wwPDB may need to remove (hereafter obsolete) the wwPDB Core Archive Entry (hereafter Entry) to help ensure the accuracy of the scientific record.

Examples of cases in which this might occur include (but are not limited) to the following:

- The Principal Investigator responsible for the Entry requests that the Entry be obsoleted.
- Retraction of a published paper describing the collection and analyses of data contributed as part of the Entry by some or all of the publication authors or by the Editor of the Journal in which it appeared.
- A qualified third-party (*e.g.*, Research Integrity Officer at the Host Institution of the Principal Investigator responsible for the Entry) is advised in writing by a formally-appointed independent investigative body (*e.g.*, External Expert Review Panel) that the Entry should be obsoleted, and informs wwPDB leadership of the circumstances by providing supporting documentation (*e.g.*, External Expert Review Panel Report).
- A governmental or supranational agency with jurisdiction in the region (*e.g.*, US Department of Health and Human Services Office of Research Integrity) is advised in writing by an official investigative body (*e.g.*, US Administrative Law Court Judgement published in the US Federal Register) that the Entry should be obsoleted.

In such circumstances, the wwPDB will first make best efforts to advise Entry authors.

Thereafter, the wwPDB may obsolete the Entry and specify the reason for doing so using the following PDBx/mmCIF data item: _pdbx_database_PDB_obs_spr.details (*e.g.*, journal publication retraction).

N.B.: The common policy will be reviewed on a regular basis and updated as necessary.

Discussion/Feedback

5. Advisory Committee Meeting 2026

2026 wwPDB AC Meeting (format virtual) will be hosted by PDBe

Which date would the Advisory Committee prefer?

- Friday October 9th 2026
- Friday October 16th 2026 - Preferred by wwPDB PIs

Summarise wwPDB-AC feedback and further discussion

Acknowledgements

Jeff Hoch, BMRB

Group Photo

Meeting Close

Thank you

Poliovirus Neutralization (Artist: David S. Goodsell)

Pre-Meeting Review Slides

Table of Contents

Funding Update

wwPDB Core Member Funding

- RCSB PDB: Joint NSF/NIH/DOE funding (2024-2028)
- BMRB: Inadequate budget: still need to find additional support
  - NIH NIGMS R24 funding (2023-2028), reduction in requested $900K to $542K
  - NIH R35 (2025-2030) awarded, $500K requested for BMRB & NMRbox R & D reduced to $275K
  - UConn funding 25% administrative assistant and 25% project manager positions
- PDBj: JST-NBDC and AMED-BINDS funding (2022-2027)
  - Additional budget from S. Korea for Data-out (2025-2026)
- PDBe: EMBL-EBI, Wellcome Trust (2021-2025)
- EMDB: EMBL-EBI, Wellcome Trust (2024-2027)
- RCSB PDB/PDBe/EMDB: Joint NSF/BBSRC funding to develop automated structure deposition tools (2025-2028)
- Pending: RCSB PDB/PDBe/EMDB: Joint NSF/BBSRC application to develop structure validation processes, presentation and accessibility (2026-2029)

wwPDB Associate Member Funding

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PDB India Progress Update

PDB India Update (PI/Co-PI: Prof. M. Bansal, Prof. K. Sekar, Dr. D. Mohanty)

- The first phase of funding for PDBi from NSM (India) ended in March 2024. PDBi PIs are making efforts to secure funding from Department of Biotechnology (DBT), India for a period of 5 years as a part of Indian Biological Data Center (IBDC).
- As per the requirement of DBT (India), wwPDB member PIs provided a detailed letter clarifying criteria for PDBi to join wwPDB as associate member. The said letter had been submitted to DBT and IBDC in 2024 and they had indicated that they would consider support for PDBi in the next funding cycle starting from April 2025. **The final decision is pending.**
- Indian Biological Data Center (IBDC) is working with PDBe for development of a structure analysis portal. After the funding decision for PDBi by DBT(India), **additional staff will be recruited at IBDC as per the requirement of wwPDB for associate membership.**

wwPDB Charter Updated

- Ready to admit PDBi as an Associate Member when they make their application

CHARTER OF THE WORLDWIDE PROTEIN DATA BANK

Agreement between

RESEARCH COLLABORATORY FOR STRUCTURAL BIOINFORMATICS PROTEIN DATA BANK (RCSB PDB Organization), Rutgers, The State University of New Jersey, Piscataway, New Jersey, United States

and

The EUROPEAN MOLECULAR BIOLOGY LABORATORY ("EMBL"), an intergovernmental institution established by treaty, headquartered at Meyerhofstrasse 1, 69117 Heidelberg, Germany acting through its UK Outstation the European Bioinformatics Institute ("EMBL-EBI"), located on the Wellcome Genome Campus in Hinxton, Cambridgeshire, UK, operating both the PROTEIN DATA BANK IN EUROPE (PDBe Organization) and the ELECTRON MICROSCOPY DATA BANK (EMDB Organization)

and

PROTEIN DATA BANK JAPAN (PDBj Organization), Osaka University, Osaka, Japan

and

BIOLOGICAL MAGNETIC RESONANCE DATA BANK (BMRB Organization), University of Connecticut, Farmington, Connecticut, United States

Effective from January 1, 2021

CHARTER OF THE WORLDWIDE PROTEIN DATA BANK (wwPDB)

1. Rationale

The Worldwide Protein Data Bank (**wwPDB**) was created to provide an enduring organizational framework for global management and dissemination of public-domain structural biology data.

It is essential for the progress of international science that structural biology data be maintained within a limited number of unfragmented archives, identified herein as ***wwPDB Core Archives***.

At present, the **wwPDB** manages three ***wwPDB Core Archives***, including the ***Protein Data Bank*** (***PDB***), the ***Biological Magnetic Resonance Data Bank*** (***BMRB***), and the ***Electron Microscopy Data Bank*** (***EMDB***).

It is paramount that facilities for deposition, validation, biocuration, remediation, and storage of public-domain structural biology data in the ***wwPDB Core Archives*** be managed jointly by the **wwPDB Core Members** with all services provided at no charge to **wwPDB Data Depositors**.

It is equally important that structural biology data stored in the ***wwPDB Core Archives*** be freely and publicly disseminated by the **wwPDB Core Members** and the **wwPDB Associate Members** without charge or limitations on usage.

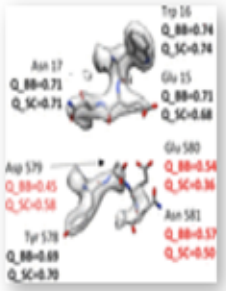
wwPDB Core Members and **wwPDB Associate Members** are fully committed to the **FAIR** Principles of **F**indability-**A**ccessibility-**I**nteroperability-**R**eusability, emblematic of responsible stewardship of public domain information.

Outreach Update

Recent Publications

Acta Cryst. (2025). D**81**, 410-422
https://doi.org/10.1107/S2059798325005923

OPEN ACCESS



Q-score as a reliability measure for protein, nucleic acid and small-molecule atomic coordinate models derived from 3DEM maps

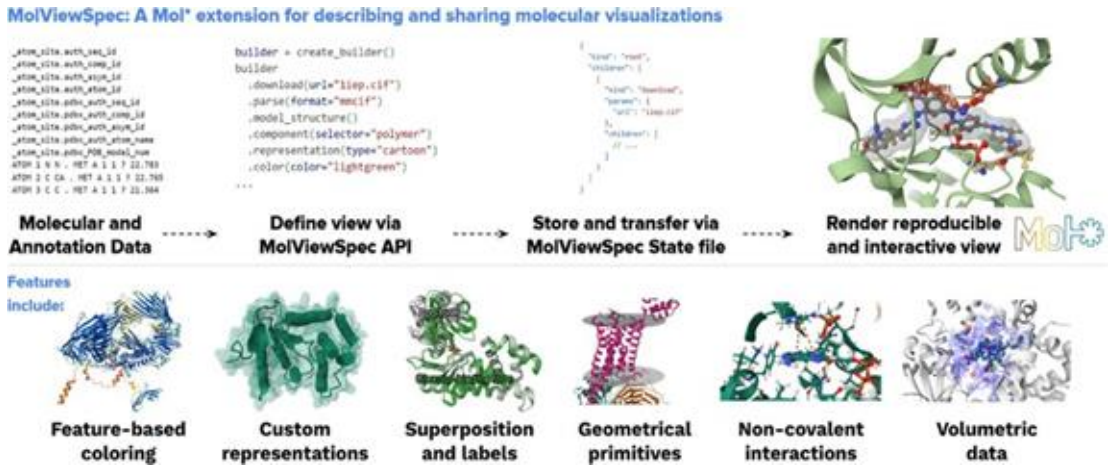
G. Pintilie, C. Shao, Z. Wang, B. P. Hudson, J. W. Flatt, M. F. Schmid, K. L. Morris, S. K. Burley and W. Chiu

Q-scores are calculated for atomic models derived from 3D electron microscopy maps, measure how well the model fits the map and reflect the quality of the map itself. Here, we develop a statistical model for *Q*-scores applied to many maps and models in the EMDB and PDB, respectively, and show how it can be used to assess the reliability of entire models as well as their subcomponents.

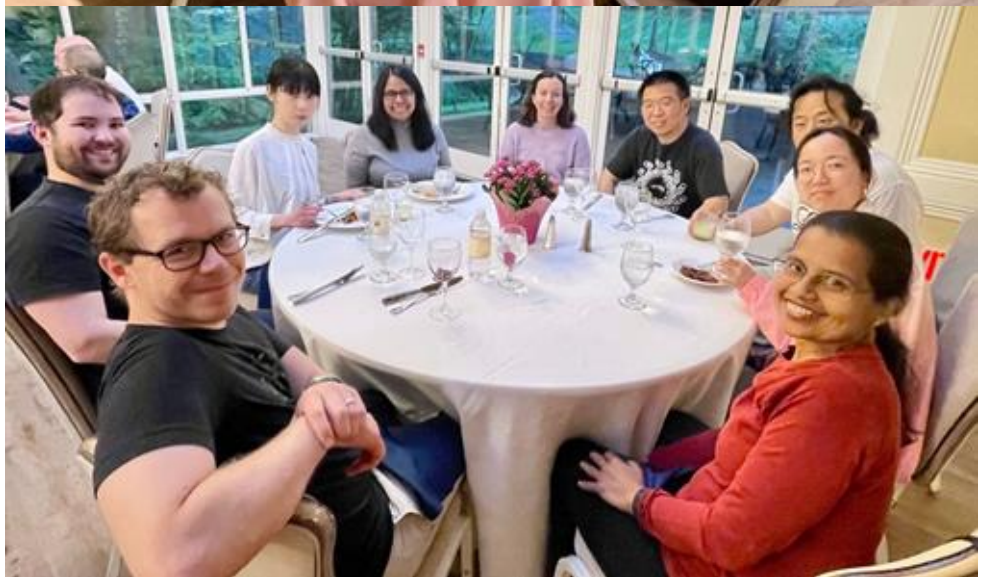
MolViewSpec: a Mol* extension for describing and sharing molecular visualizations

Adam Midlik, Sebastian Bittrich, Jennifer R Fleming, Sreenath Nair, Sameer Velankar, Stephen K Burley, Jasmine Y Young, Brinda Vallat ✉, David Sehnal ✉
Author Notes

Nucleic Acids Research, Volume 53, Issue W1, 7 July 2025, Pages W408–W414, https://doi.org/10.1093/nar/gkaf370
Published: 06 May 2025 **Article history** ▾



Team Development Summit



Team Development Summit

- Discussed formal Software Change Management, 2026 project planning, and future directions
- Major outcomes:
  - Develop and document a process for software change management with “change request for approval”
  - Improve documentation: create documentation templates to enforce more documentation
  - Adopt RACI matrix to document responsibilities within each project
  - Enable simultaneous multiple depositions to support increasing numbers of depositions and the growing trend of depositing multiple related structures, especially in 3DEM
  - Commit to modular, containerization-ready system design principles moving forward. Better preparing us for deployment on newer technologies (e.g., cloud computing).

PDBe Outreach

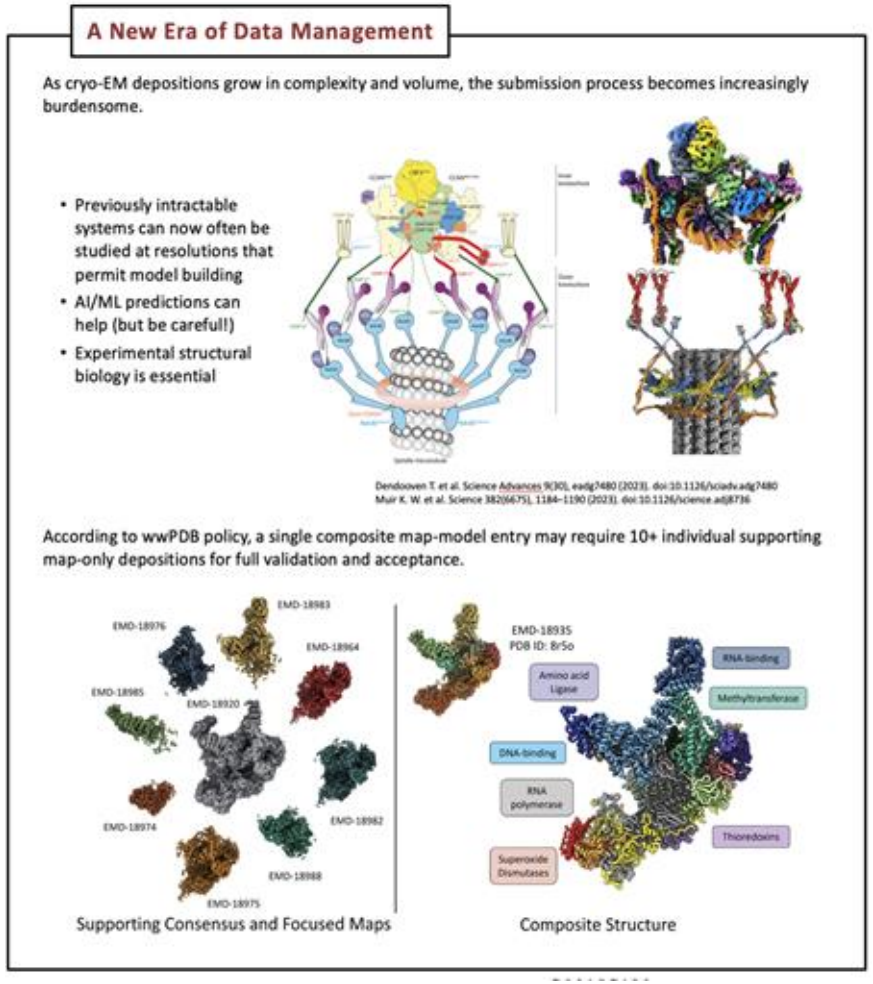
- PDBe outreach with a specific focus on data deposition and access:
  - CCP4 Study Weekend - Nottingham, UK (January 7-9 2025)
  - International Biocuration Conference - Kansas City, MO, USA (April 5-9 2025)
  - Global Phasing User Meeting, Cambridge, UK (June 30 2025)
  - CCP4 Summer School - York, UK (July 31 - August 8 2025)
  - European Crystallographic Meeting - Poznan, Poland (August 25-29 2025)

PDBj Outreach

- PDBj Talk/JASIS2025: September 3
- PDBj Talk/PSSJ2025: June 20
- PDBj Talk/DigSustain2: April 3
- PDBj booth/AsCA2024: December 1-6
- PDBJ Talk/CrSJ2024: November 10

RCSB PDB Outreach Presentations

- Biophysical Society and American Chemical Society Annual Meetings: *Improving Data Representation of Metalloproteins in the Protein Data Bank* (poster)
- Biocuration Annual Meeting: *Data Archive Challenge: Transitioning Users to New IDs and Data File Format at the PDB* (poster)
- CCP4/APS School in Macromolecular Crystallography: *wwPDB OneDep Tools for Deposition and Validation* (talk)
- American Crystallographic Association (ACA)
  - *Data Archive Challenge: Transitioning Users to New IDs and Data File Format at the PDB from Brian Hudson Streamlining OneDep Depositions of Multiple Related 3DEM Entries with pdb_extract* (talk)
  - *PDB-IHM: A System for Archiving and Dissemination of integrative structures* (talk)
  - *PDBx/mmCIF Ecosystem: Foundation for FAIR Access to Macromolecular Structure Data* (talk)
  - *Improving Data Representation of Metalloproteins in the PDB* (talk)
- NY Structural Biology Discussion Group: *Data Archive Challenge: Transitioning Users to New IDs and Data File Format at the PDB* (poster)
- Microscopy & Microanalysis (M&M): *Speeding Up OneDep Depositions of Multiple Related 3DEM Entries with pdb_extract* (poster)



RCSB PDB Training Events

- In-person Workshop:
  Enhancing PDB Deposition & Validation Practices
  - Rutgers
  - American Crystallographic Association
- Virtual Office Hours
  - Supporting Extended PDB IDs (YouTube)
  - Depositing IHM Data (YouTube)
  - PDB Policies for Deposition and Biocuration

EMDB Outreach

Workshops and Conferences:

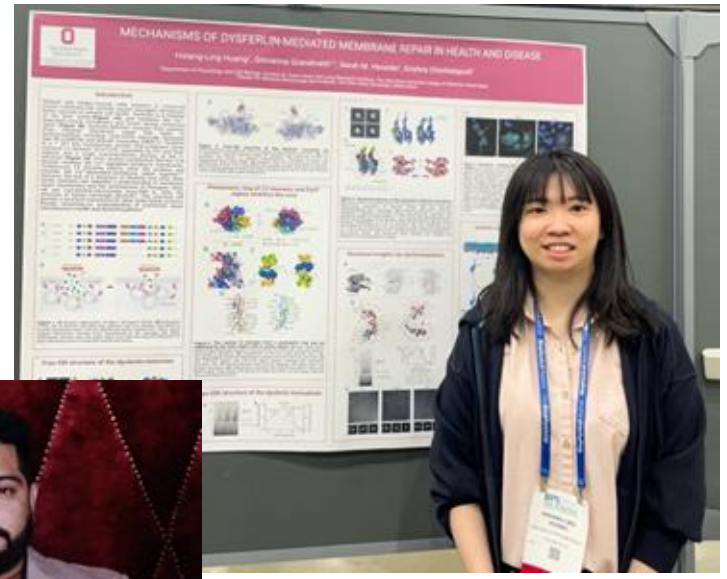
- CSHL CryoEM course (Mar 25)
- CCP-EM spring symposium (Apr 25)
- UK cryo-EM facilities meeting (Jun 25)
- EMBO cryo-EM practical course (Sep 25)
- Icknield model building workshop (Oct 25)
- EBI Structural Bioinformatics course (Oct 25)

BMRB Outreach

- Collaborating with NEF working group and the North Eastern US NMR community (NE-CODDS) to standardize the nomenclature and establish metadata recommendations for relaxation experiments (white paper in progress)
- Engaging NMR community to migrate from legacy PDB format model files to meta-data rich CIF format file. Plans to establish NMR CIF working group via a CT workshop.
- As the wwPDB merges with PDB-Dev(IHM), this is the right time to consider validation using Bayesian methods. Hosting a Bayesian workshop on 10/18-10/19/2025.
- Continue promoting BMRB at Euromar, ENC and Biophysical Society conferences

wwPDB Foundation

- wwPDB Foundation-sponsored poster prizes
  - Latin American Crystallographic Association Meeting
  - ASBMB
  - Biophysical Society
  - Planned: AsCA
- News announcements
- Social media posts



OneDep Update

wwPDB Collaboration Resources November 2024-October 2025

wwPDB Partner	Software Development	Production Maintenance/ Project Management	Requirements Setting/ Testing	Core Archive Keeping*	Outreach	Biocuration/ Remediation	Total FTE Commitments
RCSB PDB	2.3	1.4	0.2/0.2	2.0	0.3	6.0	12.4
PDBe	1.15	0.6	0.15/0.15	-	0.1	3.9	6.05
PDBj	1.3	0.6	0.2/0.2	-	0.1	7.2 +	9.6
BMRB	0.85	0.1	0.2/0.2	0.15	0.1	0.6	2.1
EMDB	1.5	0.5	0.1/0.1	1.0	0.1	0.7	4.0
Total wwPDB	7.1	3.2	1.1/0.6	3.15	0.7	18.4	34.15

*RCSB PDB; EMDB; BMRB

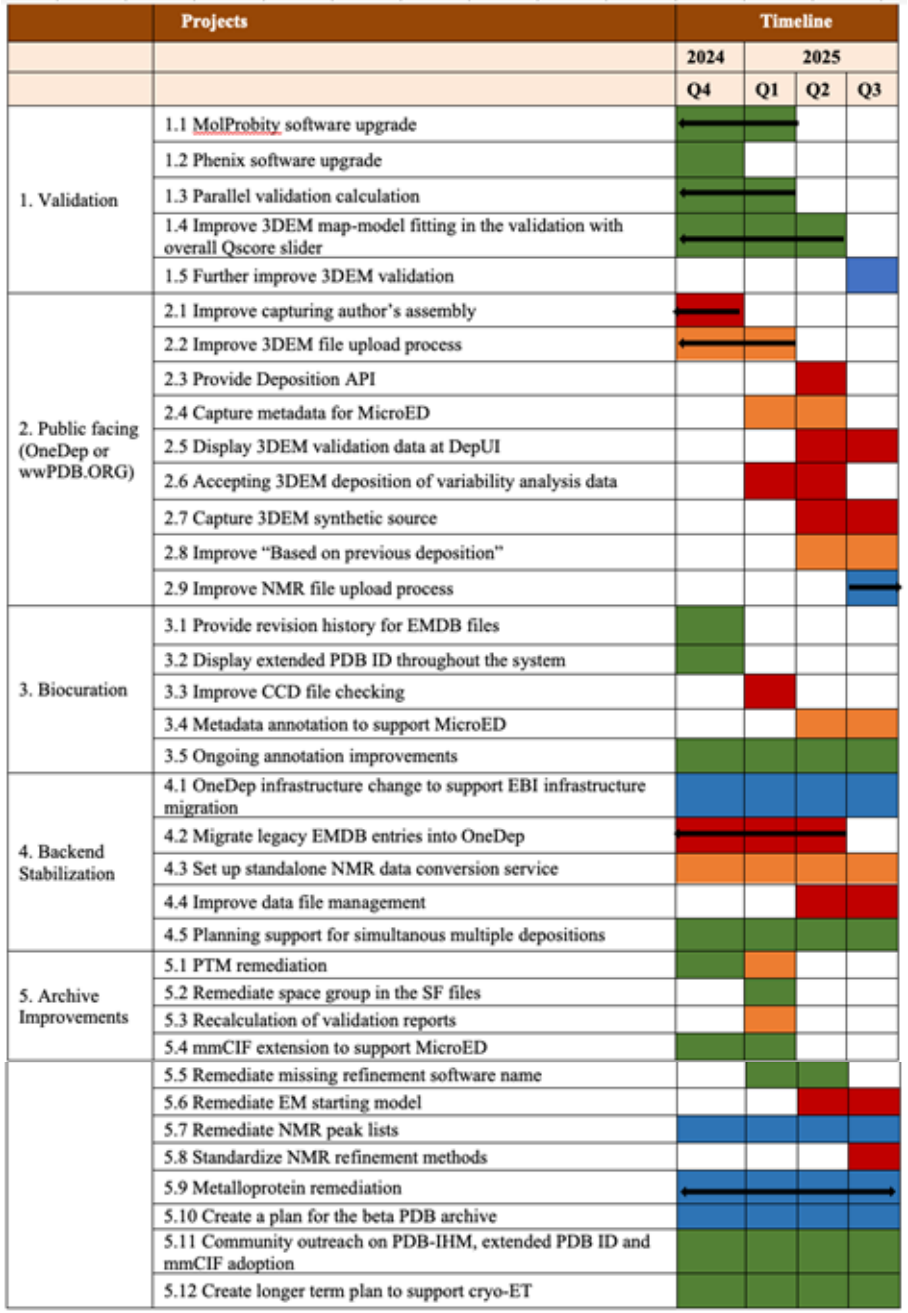
+PDBj Biocuration/Remediation includes 4.0 FTEs from PDBc

OneDep 2024/2025 Progress *versus* Goals I

- Our familiar Table is here, and details are in Reference.

Ref. Quarterly Report Appendix

Delivered,
To be delivered,
Delayed,
Project change
(On hold)



	Projects	Timeline			
		2024	2025		
		Q4	Q1	Q2	Q3
1. Validation	1.1 MolProbity software upgrade				
	1.2 Phenix software upgrade				
	1.3 Parallel validation calculation				
	1.4 Improve 3DEM map-model fitting in the validation with overall Qscore slider				
	1.5 Further improve 3DEM validation				
2. Public facing (OneDep or wwPDB.ORG)	2.1 Improve capturing author's assembly				
	2.2 Improve 3DEM file upload process				
	2.3 Provide Deposition API				
	2.4 Capture metadata for MicroED				
	2.5 Display 3DEM validation data at DepUI				
	2.6 Accepting 3DEM deposition of variability analysis data				
	2.7 Capture 3DEM synthetic source				
	2.8 Improve "Based on previous deposition"				
	2.9 Improve NMR file upload process				
3. Biocuration	3.1 Provide revision history for EMDB files				
	3.2 Display extended PDB ID throughout the system				
	3.3 Improve CCD file checking				
	3.4 Metadata annotation to support MicroED				
	3.5 Ongoing annotation improvements				
4. Backend Stabilization	4.1 OneDep infrastructure change to support EBI infrastructure migration				
	4.2 Migrate legacy EMDB entries into OneDep				
	4.3 Set up standalone NMR data conversion service				
	4.4 Improve data file management				
	4.5 Planning support for simultanous multiple depositions				
5. Archive Improvements	5.1 PTM remediation				
	5.2 Remediate space group in the SF files				
	5.3 Recalculation of validation reports				
	5.4 mmCIF extension to support MicroED				
	5.5 Remediate missing refinement software name				
	5.6 Remediate EM starting model				
	5.7 Remediate NMR peak lists				
	5.8 Standardize NMR refinement methods				
	5.9 Metalloprotein remediation				
	5.10 Create a plan for the beta PDB archive				
	5.11 Community outreach on PDB-IHM, extended PDB ID and mmCIF adoption				
	5.12 Create longer term plan to support cryo-ET				

OneDep 2024/2025 Progress *versus* Goals I

Bold: re-forecasted to 2025-2026

Red: Hold for future planning

Components	Major Projects to be Completed	Primary resource
Validation	Ongoing system improvements & bug fixing	All sites
	Upgrade 3rd party Phenix software	RCSB PDB
	Modularize validation software for easy maintenance and parallel execution	RCSB PDB
	Upgrade 3rd party MolProbity software	PDBj
	Provide quality slider of map-model fitness for 3DEM based on Q-scores	EMDB
Deposition	Ongoing system improvements & bug fixing	PDBe/PDBj/EMDB
	Improve (refactor) file upload for 3DEM depositions	**EMDB**
	Display 3DEM validation data and warnings to depositors and biocurators	EMDB
	Support EM deposition of variability analysis data	EMDB
	Improve 3DEM composite map deposition	EMDB
	Provide synthetic sources for EM entries	EMDB
	Improve file upload for NMR depositions	**PDBj**
	Improve MicroED deposition	**PDBe**
	Display extended PDB IDs throughout OneDep pipeline	PDBe
	Improve capturing author's assembly	**PDBe**

OneDep 2024/2025 Progress *versus* Goals II

Bold: re-forecasted to 2025-2026

Red: Hold for future planning

Components	Major Projects to be Completed	Primary resource
Biocuration	Ongoing system improvements & bug fixing	RCSB PDB
	Display extended PDB IDs throughout OneDep pipeline	RCSB PDB
	Improve CCD file checking	**RCSB PDB**
	Enhance biocuration with a new feature	RCSB PDB
	Provide revision history for EMDB files	RCSB PDB
Infrastructure	EBI infrastructure migration	PDBe/RCSB PDB
	Move Tools source code from CVS to github repository	RCSB PDB
	Migrate EMDB legacy entries into OneDep	EMDB/RCSB PDB
	Infrastructure planning for supporting simultaneous depositions with shared metadata	All sites
	Requirements setting for improving EM composite map depositions	EMDB
	Standalone NMR Data Conversion Service	**BMRBj/BMRB**

OneDep 2024/2025 Progress *versus* Goals III

Bold: re-forecasted to 2025-2026

Red: Hold for future planning

Components	Major Projects to be Completed	Primary resource
Core Archives	mmCIF extension to support MicroED	RCSB PDB
	Archival re-calculation of validation reports for PDB and EMDB archives	**PDBe**
	Archival EM remediation including starting model remediation	**EMDB**
	NMR peak lists remediation at PDB and BMRB archives	PDBj
	NMR refinement method remediation at PDB archive	PDBe
	PTM/PCM Remediation	**PDBe**
	Remediate SF file for missing or inconsistent cell information	RCSB PDB
	Metalloprotein remediation	RCSB PDB
	Planning for beta PDB archive	All sites
	Ongoing mmCIF dictionary development and maintenance	RCSB PDB
	Community outreach on PDB-IHM deposition, extended PDB ID, and mmCIF adoption	All sites
	Create longer-term plans to support the growth of cryo-ET	All sites

wwPDB Collaboration Resources November 2025-October 2026

wwPDB Partner	Software Development	Production Maintenance	Project Management	Requirements Setting/ Testing	Core Archive Keeping*	Outreach	Biocuration/ Remediation	Total FTE Commitments
RCSB PDB	2.3	0.6	0.8	0.2/0.2	2.0	0.3	6.0	12.4
PDBe	0.95’	0.2’	0.3”	0.2”/0.1”	-	0.15	4.2	6.1
PDBj	1.15	0.6	0	0.2/0.2	-	0.1	7.2 +	9.45
BMRB	0.85	0.1	0.1	0.2/0.2	0.15	0.1	0.6	2.3
EMDB	0.9	0.1	0.35”	0.2/0.1”	0.5”	0.1	1.0”	3.25
Total wwPDB	6.15	1.6	1.55	1/0.8	2.65	0.75	19	35.3

*RCSB PDB; EMDB; BMRB

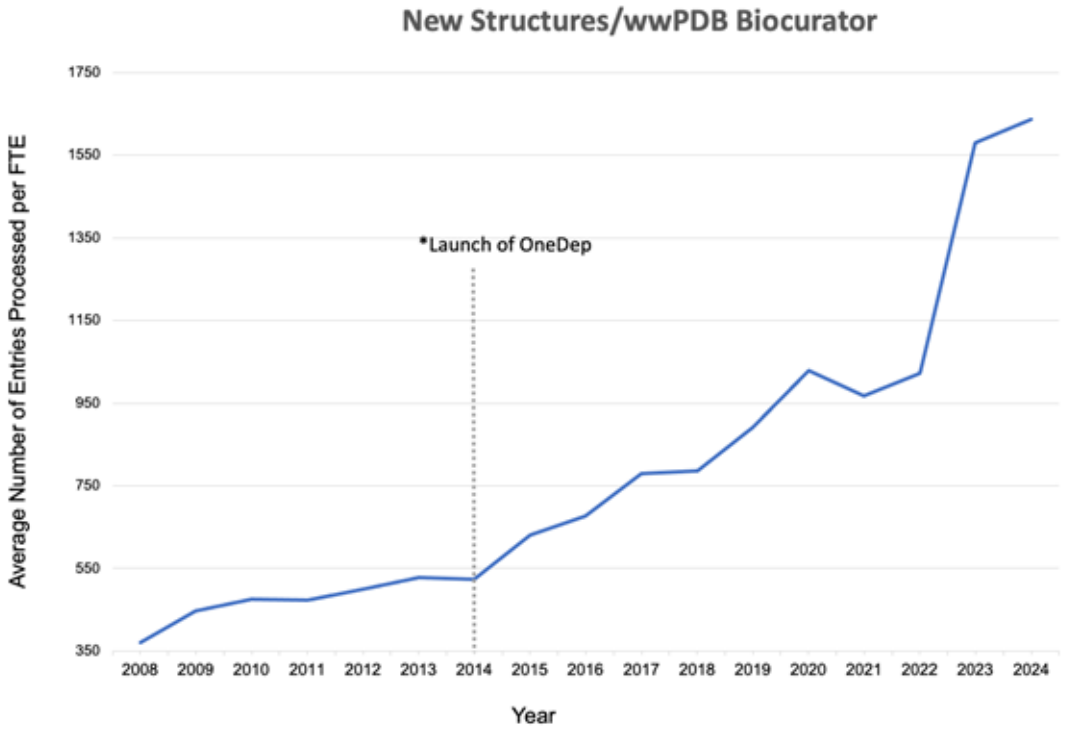
+PDBj Biocuration/Remediation includes 4.0 FTEs from PDBc

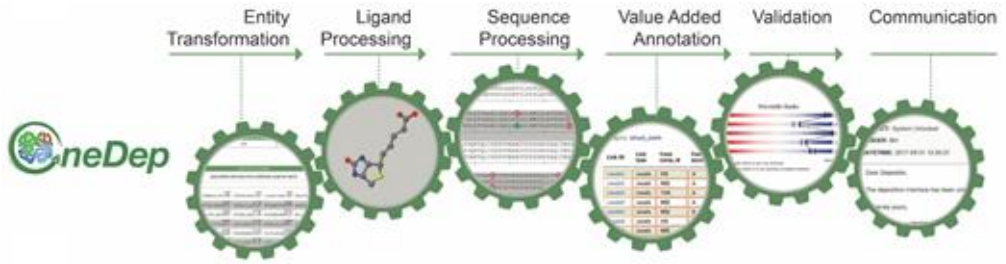
‘Joint grant funded

“Partially joint grant funded

wwPDB Biocurator Productivity

- 19,322 depositions in 2024
- Improved efficiency for biocurating incoming depositions
  - Improved workflow manager latency
  - Enabled auto-approve from depositors for 3DEM map-only entries
  - Auto-sending reminder for AUTH/REL entries after 3 weeks
  - Auto-assignment of ligand ID MSE
  - Auto-passing Transformer Module and automatic sequence annotation of acetylation" and "amidation" for terminal ACE/NH2
  - Listed entries processed > 3 weeks ago at Release Module for easy release
- Enabled search by extended PDB IDs in WFM
- Integrated PointSuite into OneDep for virus assembly annotation





OneDep 2025/2026 Goal Setting I

Components	Major Projects to be Completed	Primary resource
Validation	Ongoing system improvements & bug fixing	All sites
	Improve efficiency of validation report re-generation	RCSB PDB
	Improve MolProbity software integration and maintenance	PDBj
	Rewrite Panav in NMR validation software	BMRB
Deposition	Ongoing system improvements & bug fixing	PDBj/EMDB
	Deposition API available in OneDep	PDBe
	Refactor file upload for 3DEM depositions	**EMDB**
	Simplify NMR file upload process	**PDBj**
	Improve microED deposition	**RCSB PDB**
	Streamline data deposition with structure determination pipelines	PDBe/EMDB/RCSB PDB CCP4/CCPEM/Phenix/Global Phasing
	Improve capturing author's assembly	**PDBe**

Bold: re-forecasted from 2024-2025

OneDep 2025/2026 Goal Setting II

Components	Major Projects to be Completed	Primary resource
Biocuration	Metalloprotein annotation enhancements	RCSB PDB
	Improve efficiency of validation report re-generation	RCSB PDB
	Improving automatic ligand matching	RCSB PDB
	CCD and PRD sanity checks	RCSB PDB
	Ongoing system improvements & bug fixing	RCSB PDB
Infrastructure	EBI/PDBj infrastructure migration/upgrade	PDBe/PDBj
	NMR standalone data conversion tool	PDBj/BMRB
	PISA software update	RCSB PDB
	Upgrade ChimeraX	EMDB
	Upgrade OpenEye	RCSB PDB
	wwPDB Summit preparation	All sites

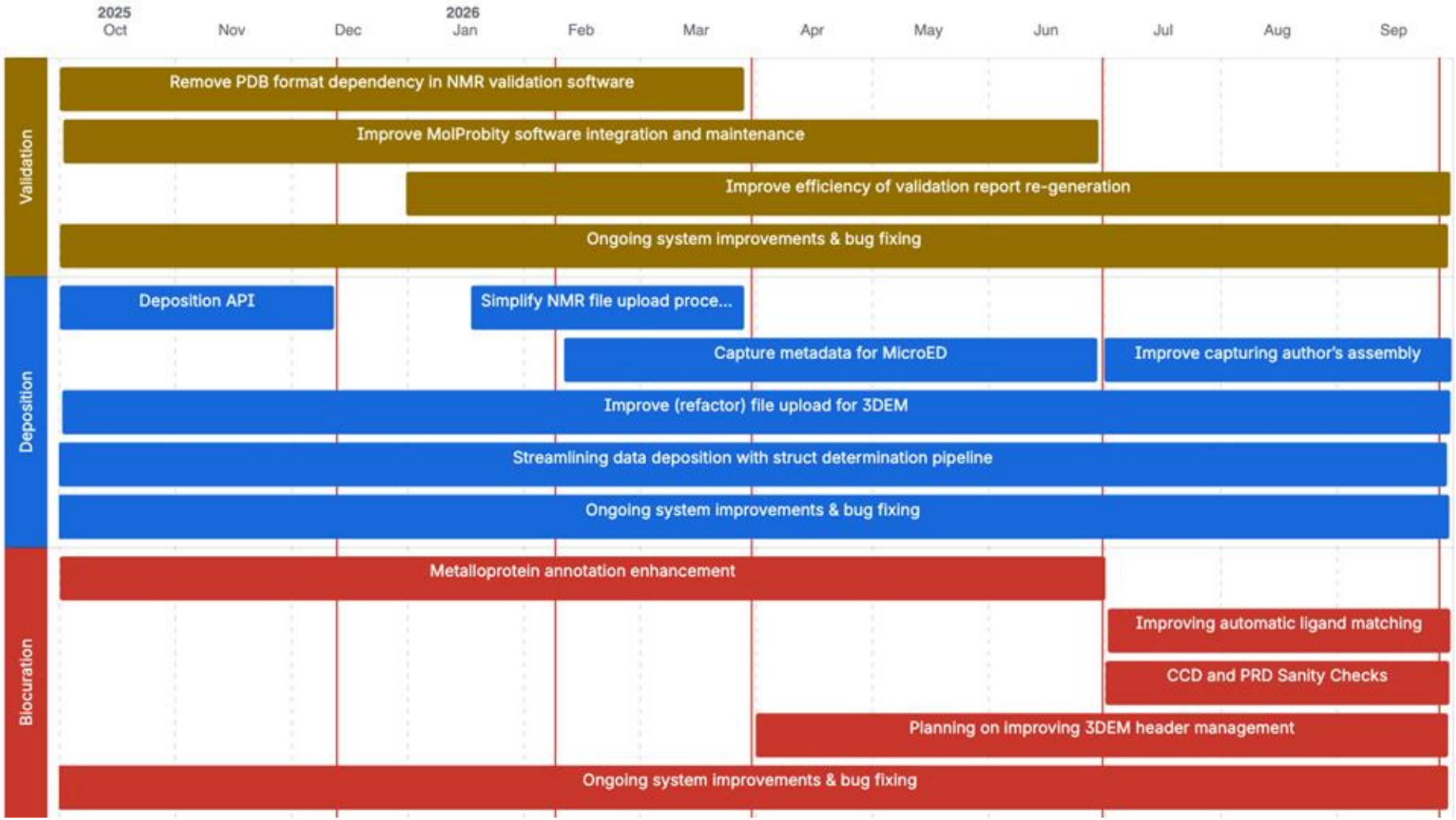
Bold: re-forecasted from 2024-2025

OneDep 2025/2026 Goal Setting III

Components	Major Projects to be Completed	Primary resource
Core Archives	**Remediate MicroED entries**	**All sites**
	Archival re-calculation of validation reports	**PDBe**
	Metalloprotein remediation	RCSB PDB
	Creation of beta PDB archive	RCSB PDB
	PTM/PCM remediation	**PDBe**
	NMR peak lists remediation	PDBj
	Ongoing mmCIF dictionary development and maintenance	RCSB PDB
	Community outreach on PDB-IHM deposition, extended PDB ID, and mmCIF adoption	All sites

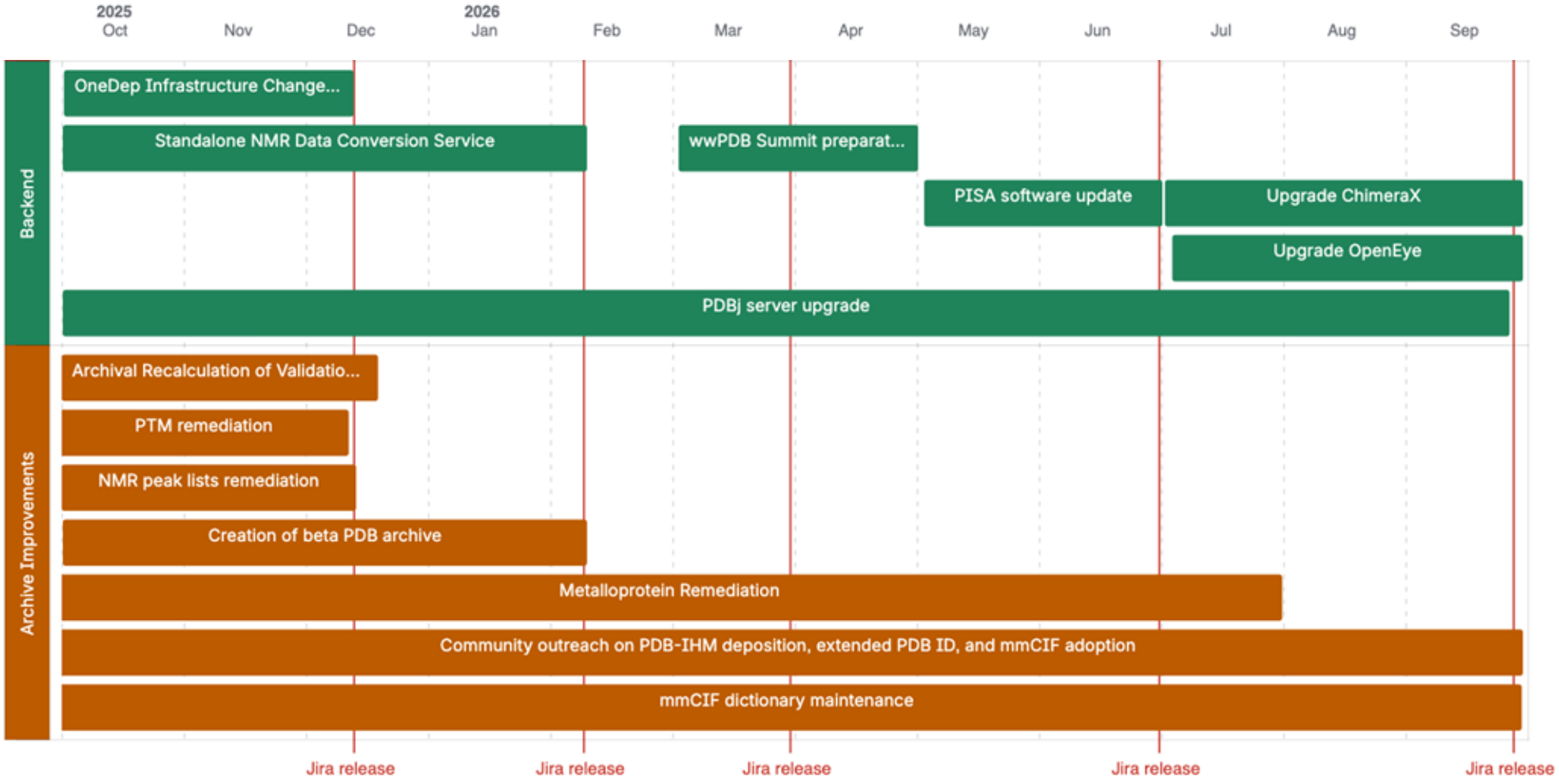
Bold: re-forecasted from 2024-2025

OneDep 2025/2026 Roadmap I



- will be further adjusted based on requirement setting

OneDep 2025/2026 Roadmap II

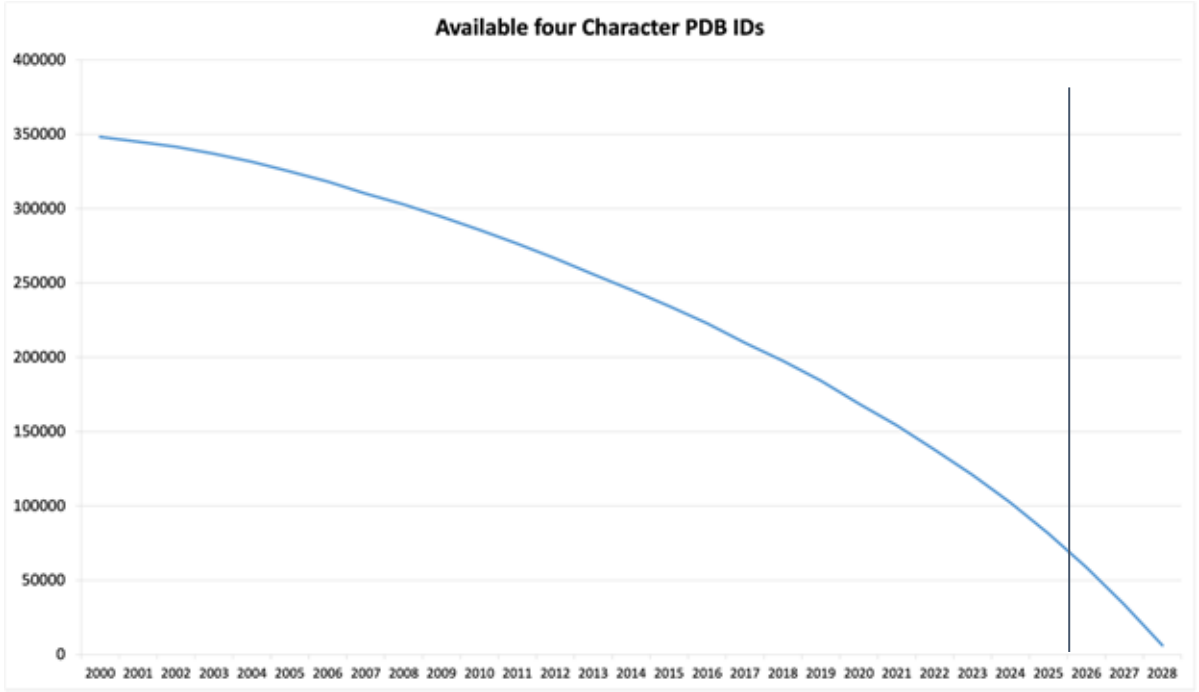


- will be further adjusted based on requirement setting

Five-year Plan for Transitioning to New PDB ID Format

- Anticipating change required in the 4 years
- Community outreach on transitioning to new PDB ID and PDBx/mmCIF formats
  - **2023: provide an FAQ page on new PDB IDs**
  - **2024: create a PDBx/mmCIF documentation for user training**
  - **2024-2025: update archival files to include new PDB IDs**
  - 2026: create a PDB "beta" archive with new PDB IDs in file naming
  - 2027: modify OneDep software to issue extended PDB IDs with new file naming
  - 2028: switch PDB beta archive to PDB archive when four-character PDB IDs are consumed
  - Ongoing: provide PDBx/mmCIF training courses at regional data centers
  - Ongoing: advertise extended PDB ID format and transition plan at professional society meetings and social media

Bold: completed




```
loop_
_database_2.database_id
_database_2.database_code
_database_2.pdbx_database_accession
_database_2.pdbx_DOI
PDB pdb_00001abc pdb_00001abc
10.2210/pdb_00001abc/pdb
```

PDB Archive Update

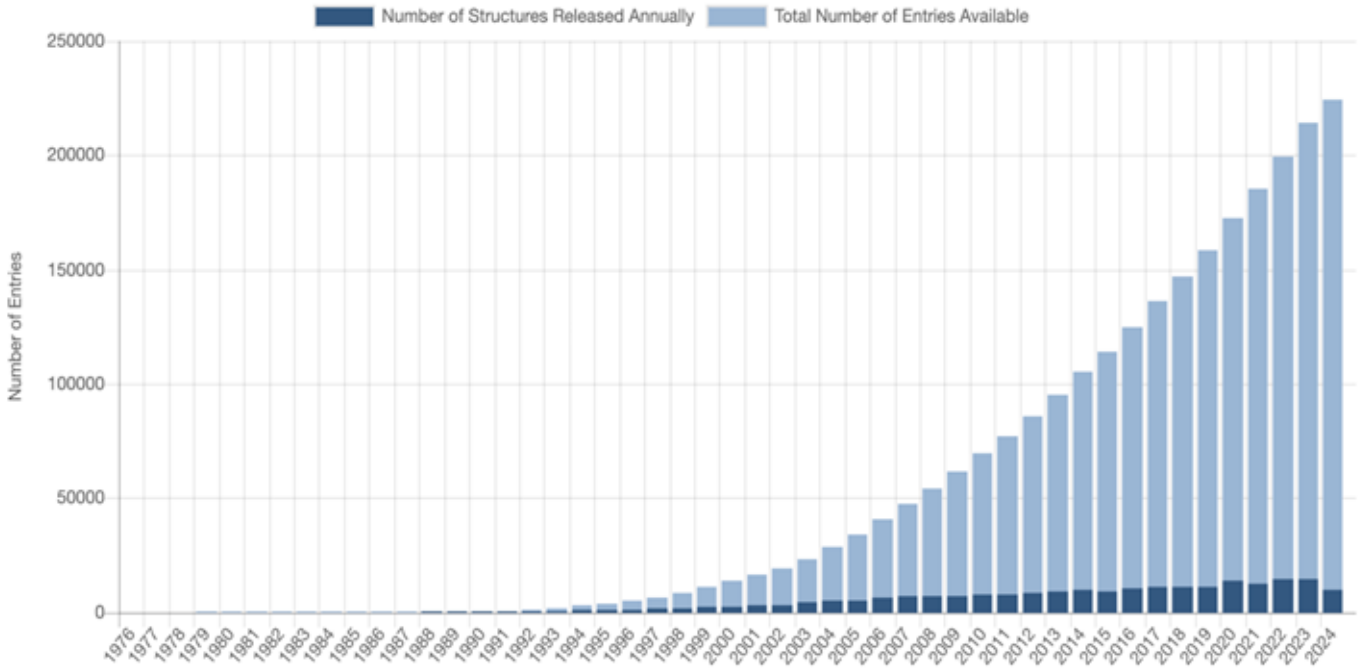
Current PDB Archive Status

- Total Entries=241,386
  (as of 9/04/2025)

- Core Archive Storage (as of Feb. 07 2025)
  - OneDep Sessions: ~114 TB
  - ftp(legacy + versioned): ~1.8 TB
  - ftp snapshots: ~21.1TB
  - EMDB ftp: ~21 TB

- Both PDB and PDB-IHM data being housed and delivered by Amazon Web Services (AWS) with no storage or egress fees

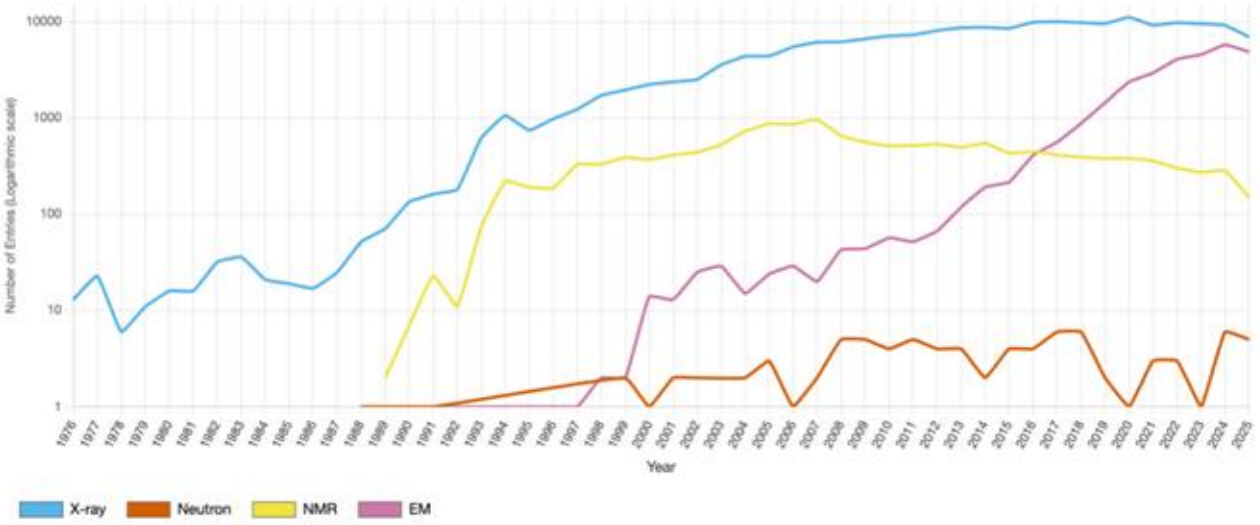
- NextGen archive serving enriched annotation in the atomic coordinate files (https://files-nextgen.wwpdb.org)



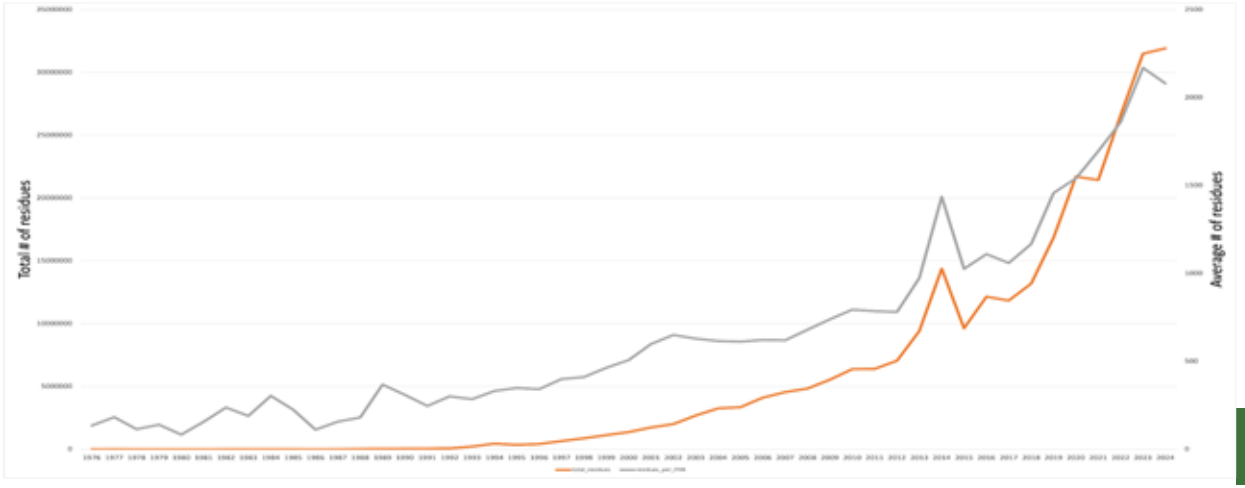
PDB Archive Growth in 2024

- Year-end holdings 226,672
- 15,475 new entries released
- Archival entries growing in both size and complexity
- Record 5,792 new 3DEM entries released
  - ~27% increase *versus* 2023

Growth of PDB Archive



Growth of Residues

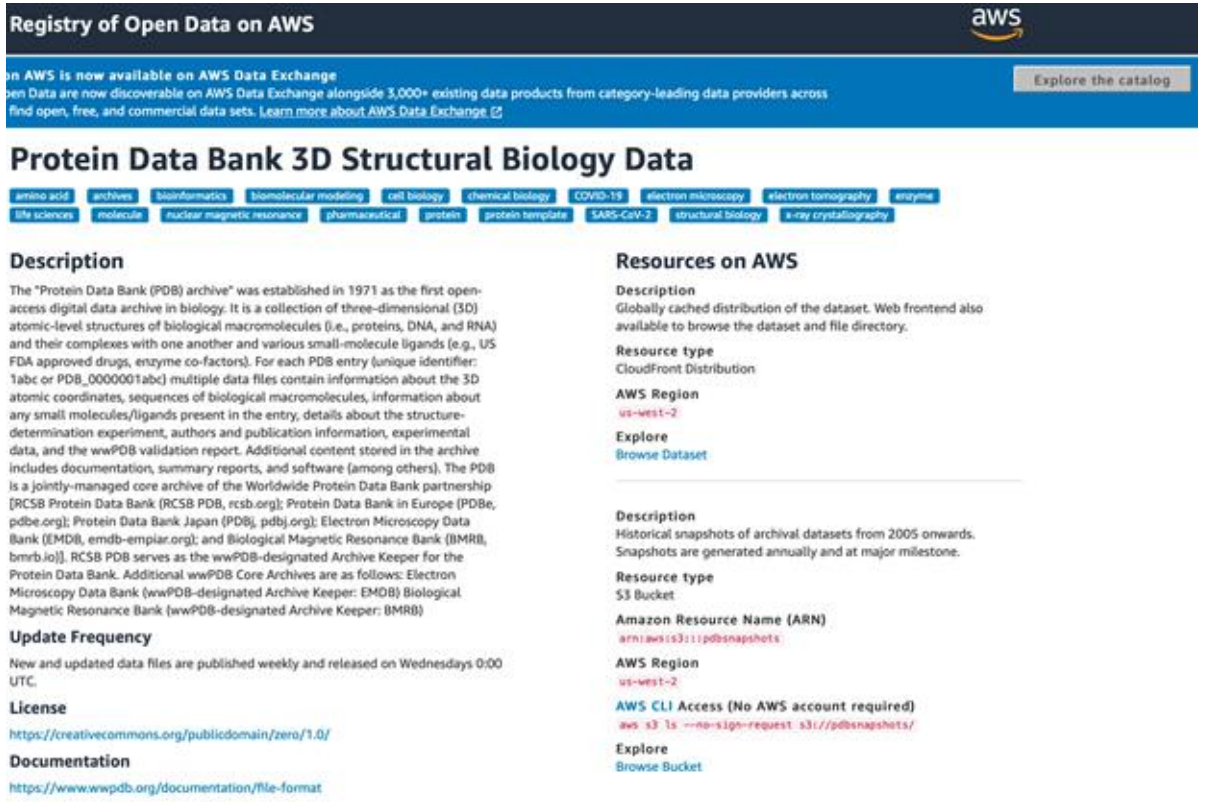


PDB Data Delivery via AWS

- Amazon Web Services (AWS) Open Data Sponsorship Program now housing and delivering PDB data
  - No storage fees charged to RCSB PDB
  - No egress fees charged to PDB users

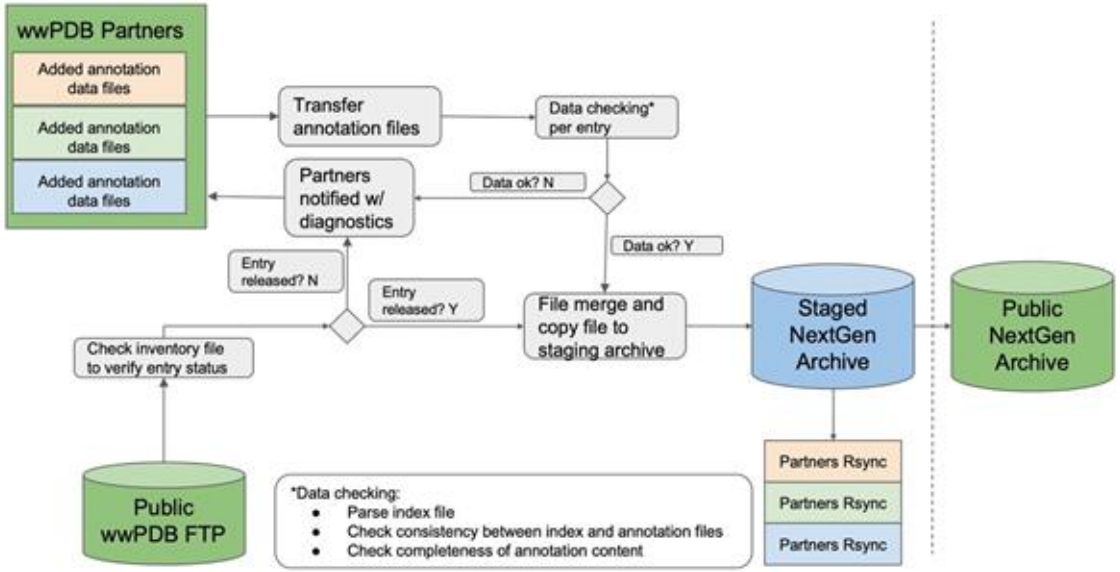
- Current AWS holdings include:
  - Annual PDB Archive Snapshots
  - Current PDB FTP Archive (updated weekly)
  - **PDB-IHM data**

- AWS can deliver PDB data faster than RCSB PDB, PDBe, or PDBj!
  - https://files.rcsb.org



NextGen PDB Archive

- NextGen Archive V1.0 launched in February 2023
  - https://files-nextgen.wwpdb.org, rsync://rsync-nextgen.wwpdb.org
- Provides enriched annotation from external database resources in the PDBx/mmCIF files
  - Sequence annotation such as UniProt, CATH, SCOP2 and Pfam from SIFTS
  - Intramolecular connectivity for each residue (atom pairs, bond order, aromatic flag, and stereochemistry)
- Automated monthly update process
  - Updated every month on the 1st Wednesday at 00:00 UTC
- Work described in a cited *Database* publication
- **More than 26,580,498 downloads since Feb. 2023**
  - 2023 (Feb.-Dec.) - 6.5 millions
  - 2024 (Jan.-Dec.) - 12.5 millions
  - 2025 (Jan.-Aug.) - 7.6 millions



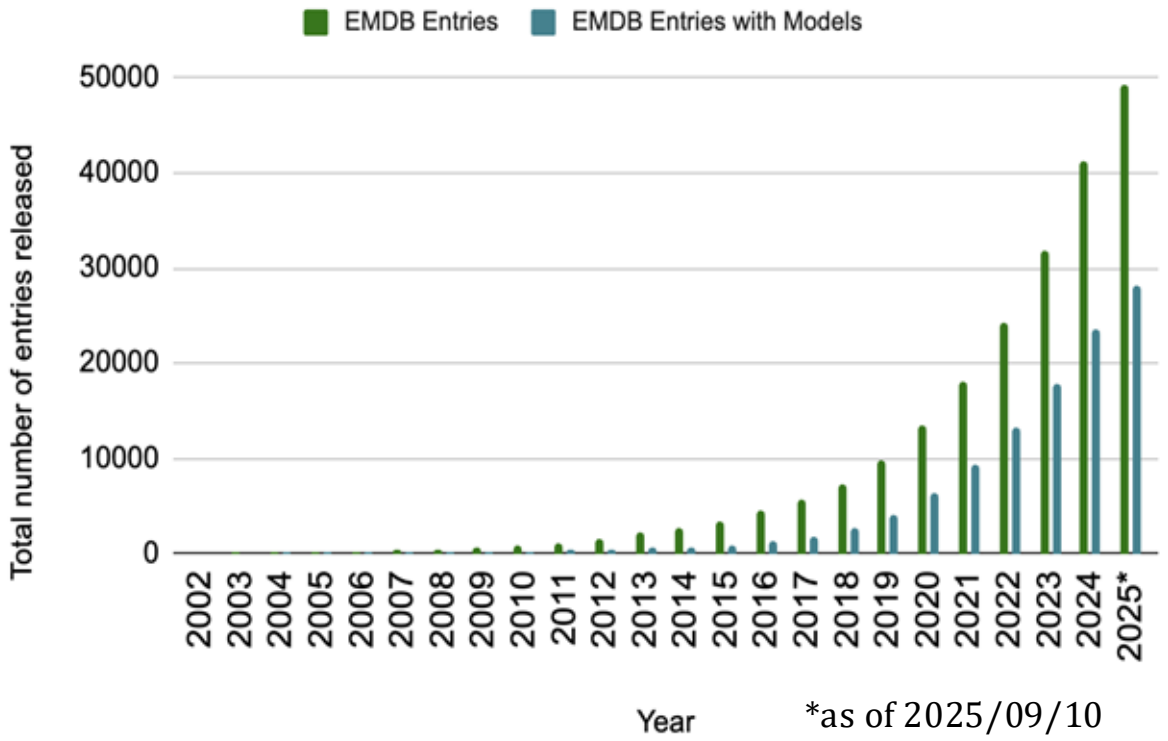
Staff changes

- New biocurator at PDBe, started in October 2025, replacing a biocurator reaching the end of their 9 years at EMBL
  - X-ray background from PhD at University of Southampton & Diamond Light Source
  - 0.8 FTE commitment to OneDep biocuration

EMDB Archive Update

Current EMDB Archive Status

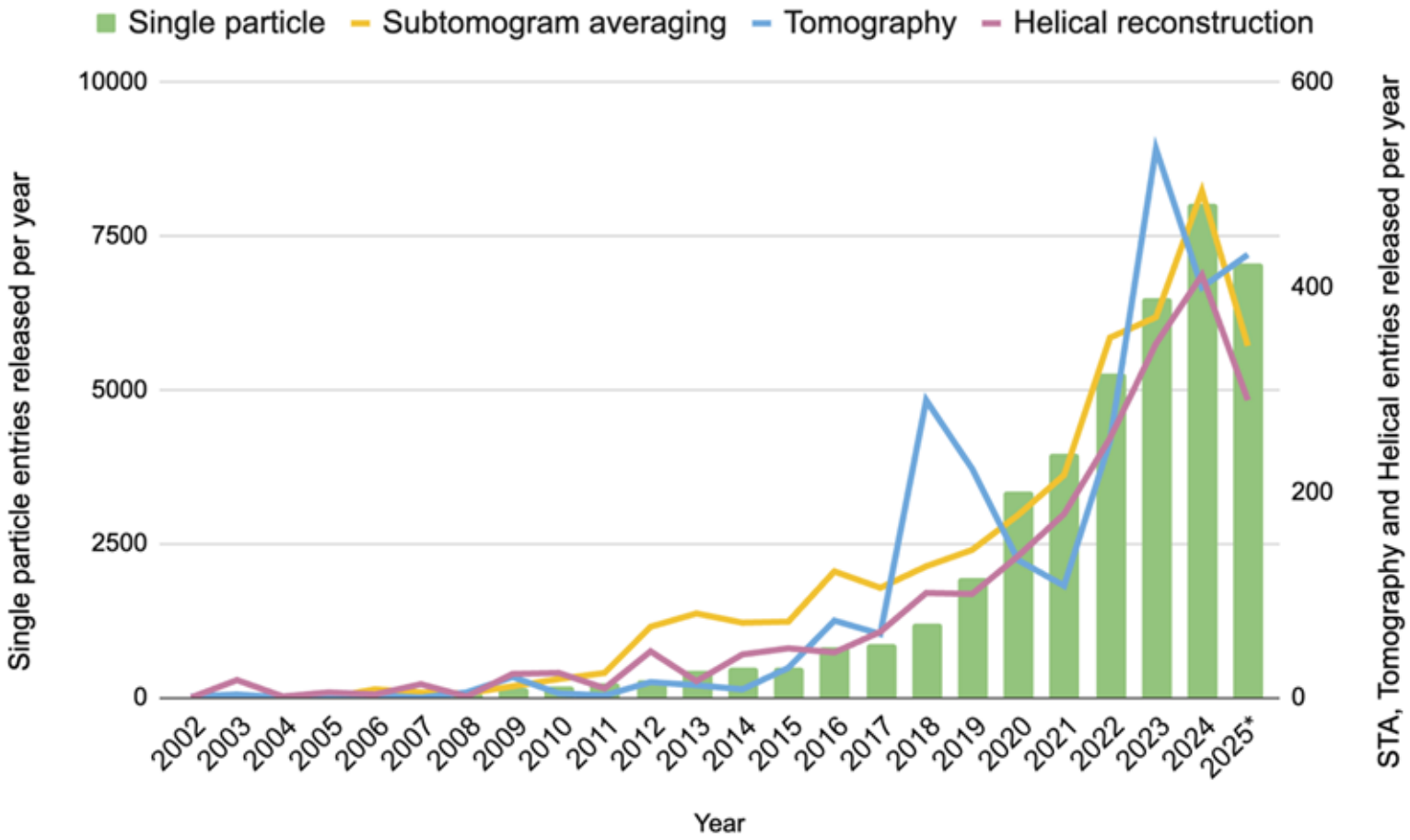
- EMDB entries: 49,400
- EMDB Archive: 28 TB
  - (as of 2025/09/10)
- 29,248 (60%) with models in PDB
- 86% published
- 10% unpublished
- 4% bioRxiv



*as of 2025/09/10

Current EMDB Archive Status

Total entries per EM-submethod



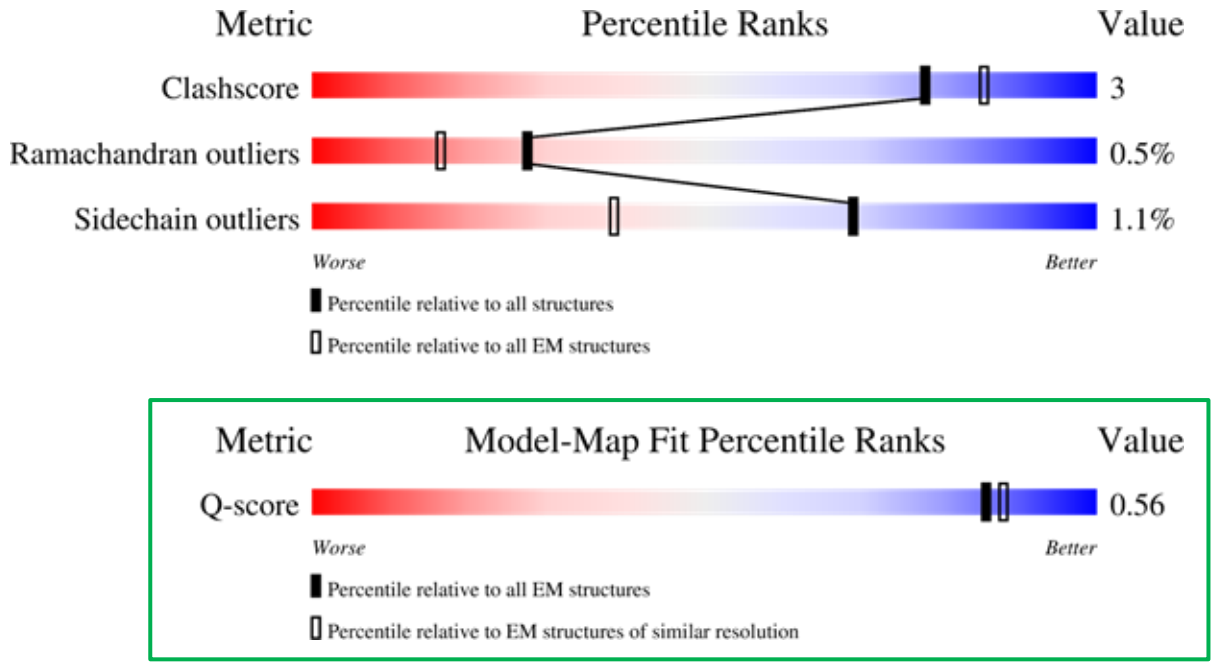
*as of 2025/09/10

2024 - 2025 Achievements

- Q-score percentile sliders moved to wwPDB validation reports
- Deposition mmCIF file creation prototyped within eBIC - CCP-EM pipeline
- Pilot software deposition pipeline
- Expansion of the mmCIF dictionary
- The development of a composite map guide, helping users to more efficiently deposit a composite map set of entries.

Q-Score percentile sliders

- From October 1st 2025 the wwPDB PDF validation reports will include a percentile score based on the Q-score model-map validation metric.
- This is the first 3DEM specific percentile slider incorporated into the wwPDB PDF validation reports. Accompanying the release will be updated help text in the wwPDB validation help guide.
- This validation is aimed at supporting expert and non-expert users in evaluating 3DEM entries.



Pilot deposition file (mmCIF) pipeline

- The EMDB (and PDBe) team worked closely with eBIC to develop and deploy prototype software that extracts and converts metadata files from microscopes into mmCIF format.
- Concurrently, the CCP-EM team worked in consultation with the EMDB team to develop Doppio support for metadata import and export in mmCIF, supporting metadata traversal from microscope to OneDep.
- mmCIF file creation was tested in the eBIC | CCP-EM data processing pipeline. In test depositions these mmCIF files automatically fill ~50% of mandatory items for a SPA entries in the deposition interface.
- Potential to extend descriptions of the imaging and processing pipelines.

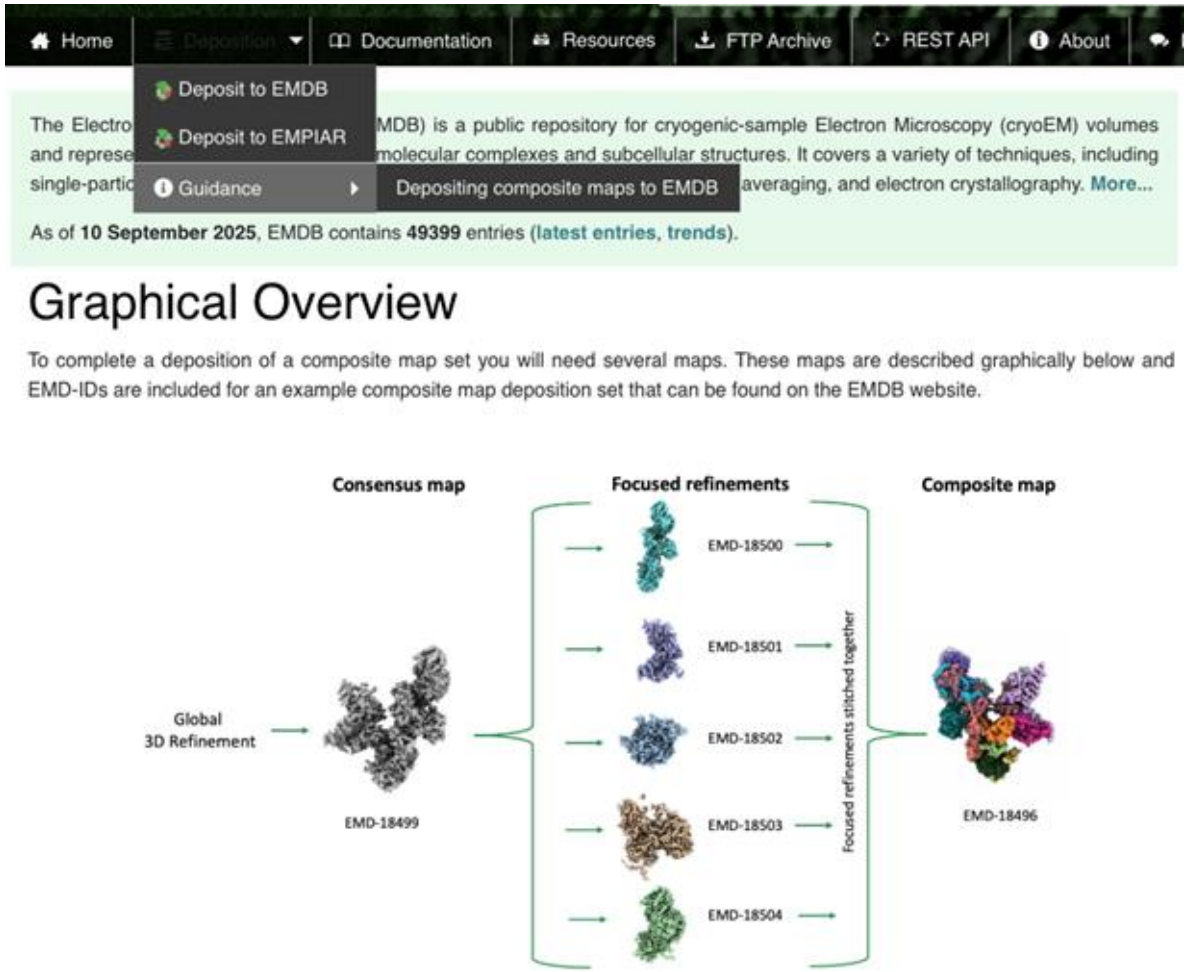
mmCIF Dictionary Expansion

- In working closely with CCPEM (previous slide) areas for mmCIF dictionary improvement and expansion were identified.
- Software can now be cited directly in the em_software category. This approach groups data together sensibly and leads to a more intuitive and human readable mmCIF file.
- We also introduced an em_motion_correction category on advice from the CCPEM developers, allowing us to capture of how motion correction was carried out for 3DEM experiments.

```
loop_
_em_software.category
_em_software.details
_em_software.id
_em_software.image_processing_id
_em_software.fitting_id
_em_software.imaging_id
_em_software.name
_em_software.version
_em_software.reference_DOI
'PARTICLE SELECTION'       ? 1  1 ? ? RELION          ?     10.1042/BCJ20210708
'IMAGE ACQUISITION'        ? 2  ? ? 1 SerialEM        4.0   10.1017/S1431927603445911
MASKING                    ? 3  ? ? ? ?               ?     ?
'CTF CORRECTION'           ? 4  1 ? ? Warp            1.0.9 10.1038/s41592-019-0580-y
'LAYERLINE INDEXING'       ? 5  ? ? ? ?               ?     ?
'DIFFRACTION INDEXING'     ? 6  ? ? ? ?               ?     ?
'MODEL FITTING'            ? 7  ? 1 ? 'UCSF ChimeraX' 1.5   10.1002/pro.3943
OTHER                      ? 8  ? ? ? ?               ?     ?
'MODEL REFINEMENT'         ? 9  ? 1 ? ?               ?     ?
'INITIAL EULER ASSIGNMENT' ? 10 1 ? ? ?               ?     ?
'FINAL EULER ASSIGNMENT'   ? 11 1 ? ? RELION          4.0   10.1042/BCJ20210708
CLASSIFICATION             ? 12 1 ? ? RELION          4.0   10.1042/BCJ20210708
RECONSTRUCTION             ? 13 1 ? ? RELION          4.0   10.1042/BCJ20210708
```

Composite map guide

- A comprehensive guide for the most efficient deposition of composite maps is now available at emdatabank.org.
- Depositors of composite maps are provided a link to the guide in an effort to streamline deposition.
- In the last 12 months the guide has had >2000 views from 980 unique users (~600 composite map entries deposited in the same period)



Staff changes

- EMDB Archive Project Lead came to end of 9 years March 2025
- EMDB Project Lead promoted from software & annotation team
- New biocurator started in February 2025:
  - 3DEM background from PhD at Queen Mary, London (Pickersgill lab)
  - 0.75 FTE commitment to OneDep team

Other achievements

EMDB projects that will feed into future wwPDB activities

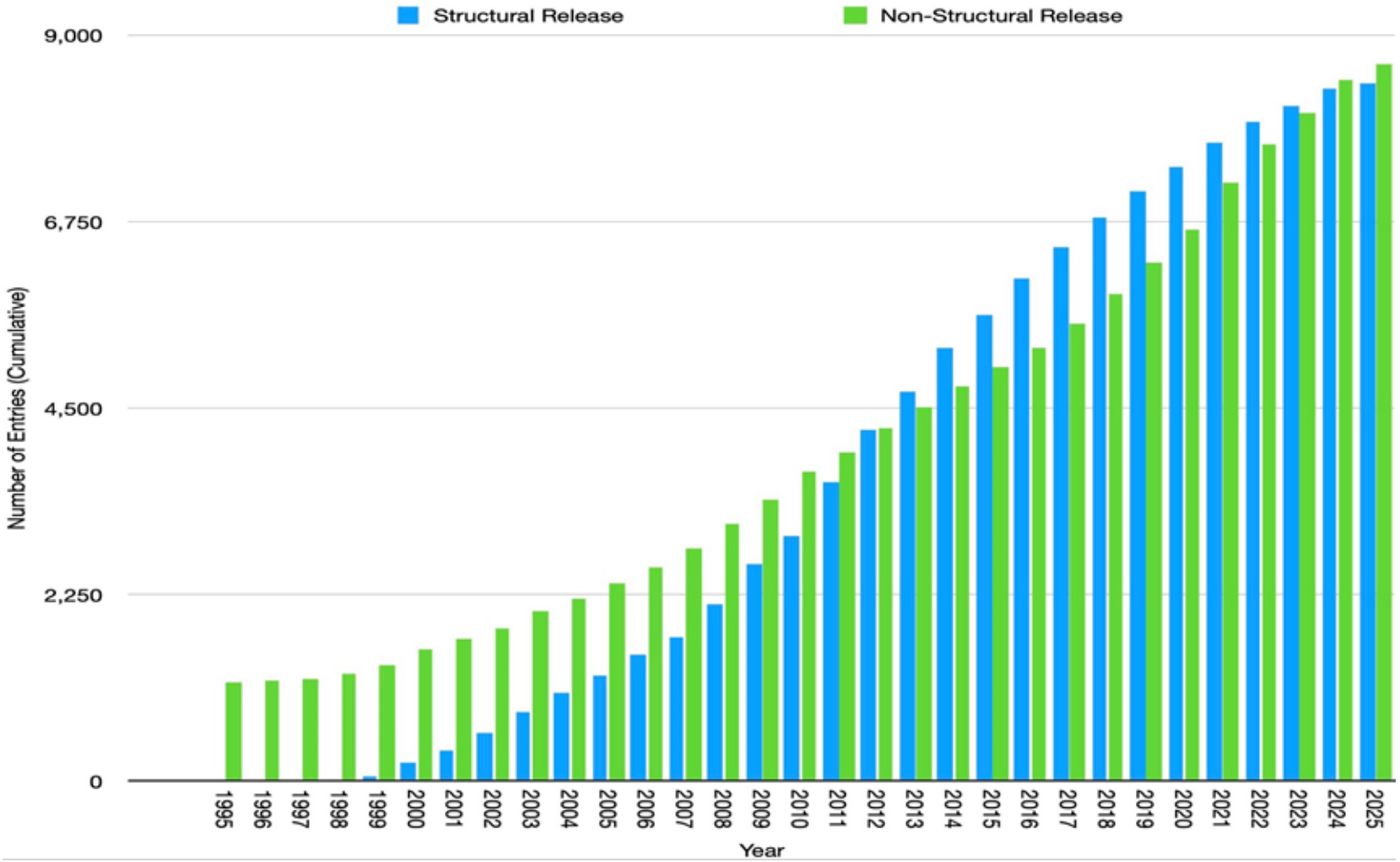
- Delivered Activities:
  - EMDB archive data release pipeline redesign
    - To enable processing of increased numbers of entries when released by OneDep
    - Release process stress tested on release size anticipated in 2035 (projected)
    - All manual release checks previously performed are now automated
  - Half-map masking detection at data release
    - Implemented as part of release data quality checks
    - Could be implemented to automate biocurator data quality checks
    - Could be implemented to block policy breaking data at point of deposition
- Ongoing Activities:
  - Masked and corrected FSCs on T1 and T2 by end of 2025
  - Model-map FSC, local resolution tools undergoing performance evaluation

BMRB Archive Update

Developments since 2024 Meeting

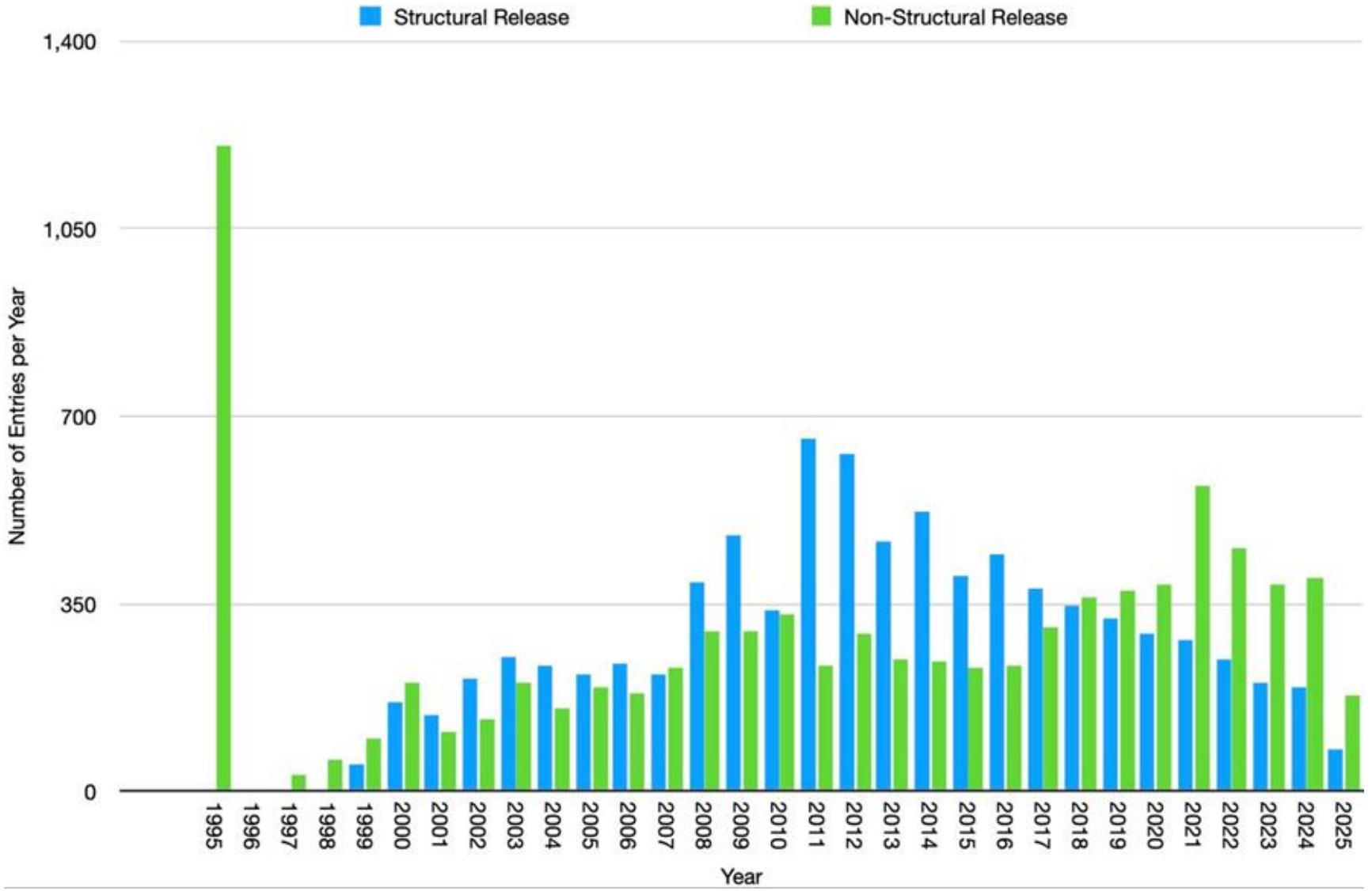
- The restraints remediation project is near completion (target completion: Dec 2025)
  - Legacy restraints have been translated into NMR-STAR and NEF format restraints are now available in the FTP archive
  - validation reports for the translated legacy restraints is being generated
- Peak list remediation project is near completion
  - BMRBj has converted 3rd party software-specific peak lists into NMR-STAR format. Refinement of the conversion logic is in progress.
- The secondary structure histogram combining PDB and BMRB data is added to the BMRB chemical shift statistics page
- BMRB validation report enhancements include chemical shift outliers, reference errors and RCI plots. BMRB now generates PDF validation reports.
- BMRB continues to collaborate with CoMD/NMR resource at NYSBC to develop the data standards and tools to facilitate deposition of relaxation data
- NAN/BMRB integration to facilitate easy data deposition is completed

BMRB Core Archive Growth



Cumulative Count as of August 20, 2025

BMRB Core Archive Growth



As of August 20, 2025

BMRB Core Archive Growth

Total Released Entries

Year	In Year Totals				By Year Totals				Withdrawn	
	Structural release	Nonstructural release	Original release	Total release	First release	Total release	Structural release	Nonstructural release	Withdrawn during year	Eventually withdrawn from this year
2015	403	233	636	696	10626	12915	5635	4991	0	75
2016	441	234	675	918	11301	13833	6076	5225	1	22
2017	379	305	684	839	11985	14672	6455	5530	5	70
2018	348	361	709	855	12694	15527	6803	5891	3	33
2019	323	375	698	968	13392	16495	7126	6266	4	37
2020	295	386	681	836	14073	17331	7421	6652	5	69
2021	281	572	853	1137	14926	18468	7702	7224	2	62
2022	249	454	703	1192	15629	19660	7951	7678	0	37
2023	205	388	593	834	16222	20494	8156	8066	0	66
2024	195	399	594	724	16816	21218	8351	8465	0	37
2025	82	194	276	330	17092	21548	8433	8659	1	28

As of August 20, 2025

BMRB Core Archive Growth

Internet Server Traffic (Website) – All Mirrors*

Year	Server requests	Page requests	File requests	Distinct hosts served	US hosts served	Total data transferred
2014	39,144,507	6,407,405	336,814	1,117,340	426,682	28.21 TB
2015	46,899,762	7,011,339	210,045	1,227,112	500,589	32.68 TB
2016	54,081,884	7,869,456	310,528	1,321,909	531,196	36.38 TB
2017	56,209,400	8,537,562	964,065	1,026,426	387,809	18.37 TB
2018	87,818,181	25,523,384	354,504	1,330,889	439,600	17.75 TB
2019	87,989,534	33,885,684	287,885	1,779,863	638,348	27.55 TB
2020	88,116,750	22,732,470	312,047	1,852,513	645,124	48.11 TB
2021	126,157,561	30,708,111	182,378	3,469,090	958,693	58.50 TB
2022	127,891,445	25,774,500	254,659	2,730,172	1,045,469	40.41 TB
2023	170,832,740	29,263,240	387,698	6,208,879	3,436,114	69.56 TB
2024	219,146,788	33,390,794	771,413	11,379,249	8,676,250	98.54 TB

BMRB has mirror sites in Italy and Japan, and BMRBj branch for deposition

In-Progress & Upcoming BMRB Projects

- Standalone Restraint Data Conversion Service Implementation (BMRBj, in progress)
- Reduction of technical debt - on-going
- Work with NEF working group and the North Eastern US NMR community (NE-CODDS) to standardize the nomenclature and establish metadata recommendations for relaxation experiments (white paper in progress)
- BMRB internal data model analysis for better tooling - in progress
- Policy documents updated to align with wwPDB, seeking BMRB AC feedback. BMRB policy webpage update is planned for Q3 2025.
- At least 5 groups are working on "re-referencing" BMRB shifts

Expansion to include BMRBe

- Discussions are continuing with Harald Schwalbe (Frankfurt) and Wim Vranken (Brussels). A white paper is being drafted.

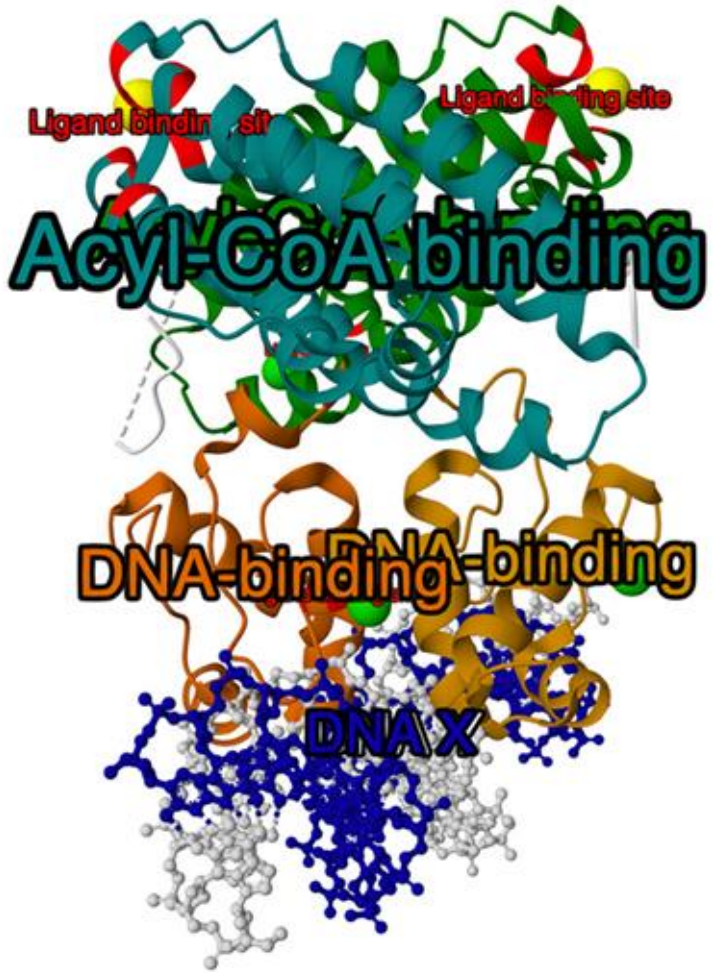
Joint Projects Update

Joint NSF/BBSRC projects

- Three year projects (three funded so far)
  - US funding provided by NSF; UK funding is provided by BBSRC
- Project 2 started in December 2021 and ended in November 2024 at RCSB; started in Jan 2023 and will end in December 2025 at PDBe
  - Provide resources for development of Mol*, web-based components for displaying annotations and efficient data delivery mechanism
- Project 3 started in September 2025 and will end in August 2028
  - Development of API to streamline data depositions with structure determination pipelines
  - Collaborate with Phenix, CCP4, Global Phasing, CCPEM
- Project 4 submitted in February 2025
  - Development of validation processes, presentation and accessibility.

Project 2: Mol* (outcome)

- Developed API to support multiscale data and multi-structure alignment from MolViewSpec (MVS) toolkit and to support annotations from external URI or within the source structure file
- Developed design of views specification and infrastructure
  a. MVS library published at public github
  b. MolView Stories under development
- **Results from this project have been published in *Current Protocols* (2024) and *Nucleic Acids Research* (2025)**



Project 3: Streamlining Data Deposition (awarded)

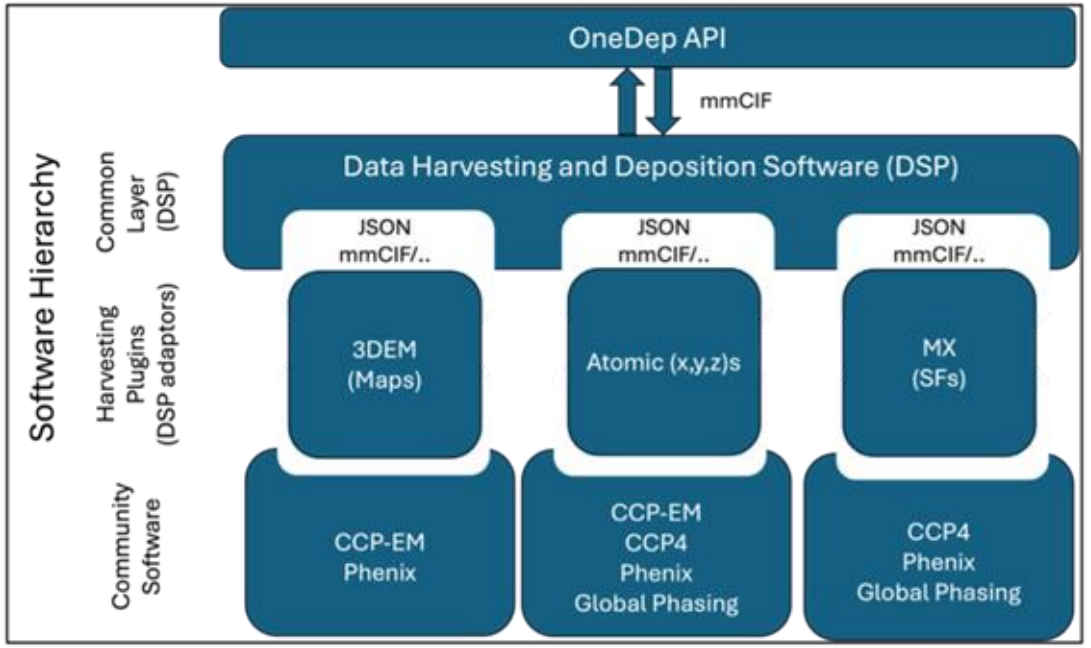
SA1. Initially improve the PDB/EMDB Depositor experience and enhance the value of the PDB and EMDB Core Archives by enabling one-at-a-time automated deposition for MX and 3DEM structures (hereafter automated deposition API) through development of a new wwPDB OneDep API that integrates existing wwPDB data management software with plugins connecting OneDep to each of the four major structure determination software packages (Phenix, CCP4, CCP-EM, Global Phasing)

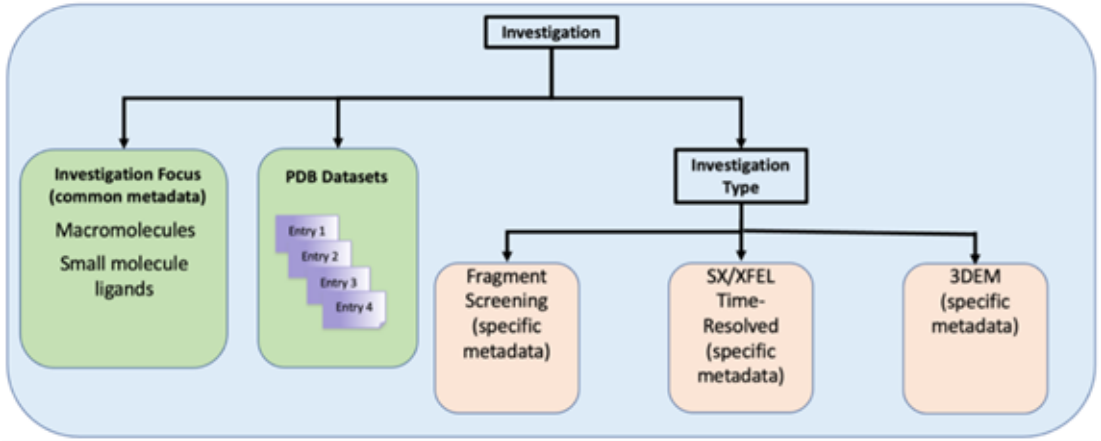
SA2. Further simplify automated depositions to PDB and EMDB and enhance quality of data in the PDB and EMDB by

- Integrating existing OneDep capabilities for biocuration and validation of biopolymer sequence information via the automated deposition API; and
- Integrating existing OneDep capabilities for identification and validation of bound small-molecule (ligand) information via the automated deposition API.

SA3. Enable automated parallel deposition, validation, and biocuration of multiple PDB structures and EMDB maps coming from single-particle 3DEM

SA4. Enable automated parallel deposition, validation, and biocuration of multiple PDB structures coming from time-resolved serial crystallography (SX) and fragment screening





Project 4: Validation (under review)

SA1. Enhance the wwPDB Depositor experience by enabling deposition of new 3D biomolecule structures to PDB and EMDB from the wwPDB Validation Server.

SA2. Extend wwPDB protocols to support more rigorous validation of 3D biomolecular structures and underlying experimental data/metadata by incorporating additional community-developed tools and computational workflows in the wwPDB Validation Server and OneDep.

SA3. Empower PDB and EMDB Depositors (structural biologists), wwPDB Biocurators, and 3D biostructure Data Consumers by increasing their efficiency and improving archival data quality through enhanced integration and delivery of information from wwPDB Validation Reports.

SA4. Develop a wwPDB software system for scientific journal editors and peer reviewers that supports secure access to atomic coordinate models, underlying experimental data/metadata, and wwPDB Validation Reports to facilitate more rigorous peer review of manuscripts reporting new 3D structures of biological macromolecules.