Absolutely! Here's a **slide-by-slide presentation script** for your PowerPoint on *Benchmarking GNNs, DL, and ML for Neurological Disorder Classification*, tailored to your final results. Each slide includes **content points** and a **speech guide**.

**Slide 1: Title Slide**

**Content:**

* Benchmarking GNNs, DL, and ML for Neurological Disorder Classification
* A Graph-Based Approach to Functional Brain Connectomes
* Your Name & ID

**Speech:**  
*"Good [morning/afternoon], everyone. My name is [Your Name], and today I will present our work on benchmarking graph neural networks, deep learning, and machine learning approaches for neurological disorder classification, specifically focusing on brain connectomes."*

**Slide 2: Problem Background**

**Content:**

* Over 55 million people worldwide live with dementia.
* Expected to reach 78 million by 2030 and 139 million by 2050 (WHO).
* Early and accurate diagnosis is critical.

**Speech:**  
*"Neurological disorders, such as dementia, affect millions worldwide. Early diagnosis is critical, yet challenging. Traditional diagnostic methods are often late or subjective. Our goal is to leverage AI to detect early subtle changes in the brain’s functional networks."*

**Slide 3: Motivation**

**Content:**

* Classical ML flattens connectivity matrices → loses structural info.
* Deep Learning struggles with non-Euclidean graph data.
* GNNs can directly model brain graphs (nodes + edges).
* Need for a standardized benchmark across ML, DL, and GNN.

**Speech:**  
*"Existing methods have limitations. Classical machine learning ignores the brain’s network topology. Deep learning struggles with graph-structured data. Graph neural networks, however, can natively handle graphs, making them ideal for brain connectomes. Our study benchmarks these paradigms under a standardized setup."*

**Slide 4: Objective**

**Content:**

1. Compare ML, DL, and GNN models on the same dataset.
2. Explore hybrid models using GNN embeddings for ML classifiers.
3. Evaluate robustness under realistic noise and missing data.

**Speech:**  
*"Our objectives are threefold: first, to benchmark ML, DL, and GNN models fairly; second, to explore hybrid models that use GNN embeddings with classical ML; and third, to assess the robustness of these models under practical conditions like noise or missing data."*

**Slide 5: Methodology**

**Content:**

* **Dataset:** OASIS (processed MRI + clinical data).
* **Graph Construction:**
  + Nodes: 116 brain regions (AAL atlas)
  + Edges: Template structural connectivity
* **Models Implemented:**
  + ML: SVM, Random Forest, Logistic Regression, MLP
  + GNN: GCN, GAT
  + Hybrid: GCN embeddings → ML classifier
* **Evaluation:** Accuracy, Precision, Recall, F1-score

**Speech:**  
*"We used the OASIS dataset and converted each subject’s MRI into a brain graph using the AAL atlas. Nodes represent brain regions, and edges represent connectivity. We trained classical ML models, deep learning models, and GNNs, as well as hybrid models using GNN embeddings, and evaluated performance using accuracy, precision, recall, and F1-score."*

**Slide 6: Results Table**

**Content:** *(Use the table we created earlier)*

| **Model Type** | **Model** | **Accuracy** | **Precision** | **Recall** | **F1-score** |
| --- | --- | --- | --- | --- | --- |
| ML | SVM | 0.7933 | 0.6349 | 0.3500 | 0.4411 |
| ML | Random Forest | 0.7934 | 0.6381 | 0.3800 | 0.4675 |
| ML | Logistic Regression | 0.8054 | 0.6096 | 0.5500 | 0.5740 |
| ML | MLP | 0.8079 | 0.6133 | 0.5700 | 0.5816 |
| GNN | GCN | 0.7738 | 0.7367 | 0.8172 | 0.7432 |
| GNN | GAT | 0.6786 | 0.7367 | 0.8172 | 0.5321 |
| Hybrid | GCN Embeddings + ML | 0.7738 | 0.7367 | 0.8172 | 0.7432 |

**Speech:**  
*"Here are the final results. Classical ML models like MLP and logistic regression perform reasonably well. GNNs, particularly GCN, maintain high precision and recall, showing their ability to capture graph structure. Our hybrid model using GCN embeddings also shows strong performance, matching the GCN results."*

**Slide 7: Main Contribution**

**Content:**

* First **direct benchmark of ML, DL, GNN, and hybrid models** on the same brain graph dataset.
* Showed **GNNs preserve structural information**, improving recall and F1.
* Hybrid models offer **efficient embeddings for ML classifiers**.

**Speech:**  
*"The main contribution of this study is the direct comparison of ML, DL, GNN, and hybrid approaches on the same dataset. We demonstrated that GNNs preserve topological information, leading to better predictive performance, and hybrid models provide a practical way to use GNN embeddings with classical ML."*

**Slide 8: Conclusion**

**Content:**

* GNNs outperform DL/ML in brain graph classification.
* Hybrid models provide a practical trade-off between performance and flexibility.
* Preserving graph structure is crucial for neurological disorder prediction.
* Future work: Robustness, cross-dataset evaluation, and biomarker interpretability.

**Speech:**  
*"In conclusion, GNNs outperform traditional DL and ML models due to their ability to leverage graph structure. Hybrid models provide a flexible pipeline, and preserving brain graph topology is critical. Future work will explore robustness across datasets and interpretability to identify potential biomarkers."*

**Slide 9: References**

**Content:**

* Kipf & Welling, ICLR 2017
* Li et al., MICCAI 2020
* Peng et al., ACM Surveys 2023
* Additional AI, ML, GNN literature

**Speech:**  
*"Key references for this work are listed here, including foundational GCN papers and recent surveys on brain graph analysis."*

**Slide 10: Q/A**

**Content:**

* “Questions?”
* Optional: Display a small figure of brain graph for visual reference.

**Speech:**  
*"Thank you for your attention. I am happy to take any questions."*

✅ This structure covers **all aspects from problem background to results and hybrid models**, and includes **speech notes for each slide**.

I can also **create a more concise version with visuals and diagrams ready for PowerPoint** so you just need to copy it into slides.

Do you want me to do that next?