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# Research Diary

PhD Research Journal

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Field: **Computer Science**



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# 1 Resources

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- [DPhil Progression Information and Resources](#)

## 2 04 February 2026

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### 2.1 Research Plan

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Today's main tasks:

- Meeting with Seth and Gunes
- Familiarise with DPhil milestones and progression requirements
- Reading relevant literature suggested during supervisor meeting
- Watch ATSMML Lecture 2

### 2.2 Content Details

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#### Meeting Summary

##### Meeting Notes:

- DPhil Milestones
  - Term 4, Week 0: Transfer status
  - 8th/9th Term: Confirmation of DPhil status
- Finding a research question
  - Bayesian Transformers
    - \* [The Bayesian Geometry of Transformer Attention](#)
    - \* [Bayesian Transformer](#)
    - \* [Transformers Can Do Bayesian Inference](#)
  - AI-assisted proofs
    - \* Existing tools: LEAN Proof Checker and [Xena Project](#), Autodiff
    - \* Possible steps:
      1. Compile dataset of theorems presented in previous conference papers (e.g. NeurIPS)
      2. Verify the theorems and proofs in the dataset
      3. Goal: Can we produce *new* theorems and proofs?
    - \* Other resources:
      - [https://en.wikipedia.org/wiki/Kevin\\_Buzzard](https://en.wikipedia.org/wiki/Kevin_Buzzard)
      - <https://terrytao.wordpress.com/2025/12/08/the-story-of-erdos-problem-126/>

· [Aristotle: IMO-level Automated Theorem Proving](#)

- Mechanistic interpretability
  - Potentially connected to encrypted backdoors
  - Talk to Marek and Junayed
- Statistical Machine Learning
  - [DeepRV: Accelerating spatiotemporal inference with pre-trained neural priors](#)
- Random Number Generators
  - Can a backdoor be hidden in a RNG/ induced through an RNG? I.e. malicious signal induced via carefully chosen "random" numbers?
  - [Planting Undetectable Backdoors in Machine Learning Models](#)
  - [Oblivious Defense in ML Models: Backdoor Removal without Detection](#)