



Enhancing Prognostication and Improving reliability of EEG assessments in Coma after Cardiac Arrest with Artificial Intelligence.

EPIC-AI is a new research programme funded by Helse Sør-Øst. We aim to improve the reliability of EEG assessment for prognostication in coma after cardiac arrest. By standardising reporting and building interpretable models, we want to make expert-level interpretation more consistent and available.

2025: LAYING THE GROUNDWORK

PROJECT LAUNCH

2025 marked EPIC-AI's transition from concept to early execution.

The year was dedicated to data access, infrastructure setup, and assessments of practical constraints in post cardiac arrest EEG prognostication.

STRATEGY SHIFT

The initial plan carried a clear risk: the available EEG data are heavily imbalanced across patient groups and recording contexts, and medication timelines are often incomplete, which can push models towards learning incorrect patterns.

We therefore shifted to a foundation-model approach that learns general EEG structure from large volumes of recordings first, then adapts to specific ICU questions, making the work more robust and broadly usable.

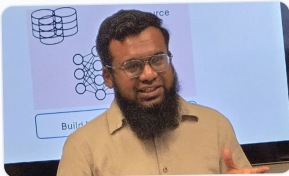
LEVERAGING DATA FROM THE VIKING PROJECT

EPIC-AI is embedded in the VIKING project (*Veien Til Kunstig Intelligens I Klinisk Neurofysiologi*). With nearly 200,000 EEGs already collected, we have the scale needed for foundation model pre-training.



<https://tinyurl.com/y44rkack>

WORKSHOP - NOVEMBER 5, 2025



The team held its first gathering, a combined kick-off and workshop where members shared domain knowledge and forged a shared vision for the path ahead.

OUR PROPOSED MODELLING STRATEGY



LUND PROGNOSTIC CLASSIFICATION

Prognostic grouping based on EEG pattern severity

BENIGN



- Reactive & Continuous
- Continuous (>20 μ V)

GOOD OUTCOME LIKELY

MALIGNANT



- Discontinuous
- Low voltage (\leq 20 μ V)
- Unreactive
- Abundant discharges

UNCERTAIN / MONITOR

HIGHLY MALIGNANT



- Suppress (<10 μ V) \pm PDs
- Burst-Suppression
- Status Epilepticus (SE)

POOR OUTCOME LIKELY

AUGMENTING OUR DATASET

To enrich our datasets further we have two ongoing data linkages:

- **Norwegian Cardiac Arrest Registry:** linkage in preparation (2015–2025) to enrich post-cardiac arrest cohorts.
- **RDAP** (Regional Dataanalyse Plattform) and **KDVH** (Klinisk datavarehus): ongoing data extraction to obtain granular sedation and medication curves. This linkage is key to untangling sedation as a major confounder in post-cardiac arrest EEG prognostication.

INFRASTRUCTURE & COMPUTE

We require significant computational power to securely process our large-scale data. That is why we are partnering with TSD (Tjeneste for Sensitive Data) and their high performance computing cluster to establish secure, high-performance modelling pipelines.

In July, Naimahmed presented the **Biaxialformer**, a novel architecture specifically designed to capture both temporal and spatial dependencies in EEG.

DOI: 10.48550/arXiv.2507.02879

<https://arxiv.org/abs/2507.02879>



NEW

OUR PLAN FOR 2026

FEB – MAR

MAY – JUN

JUL – AUG

OCT – NOV

DEC

DATA & PIPELINE

- Data processing and linkage
- Pipeline validation

FOUNDATION MODEL

- Model pre-training
- Architecture selection
- Initial benchmarking

ICU FOCUS

- Sedation analysis
- Cardiac arrest fine-tuning
- Clinical integration

REFINEMENT

- Model optimization
- Performance validation

DISSEMINATION



The Engine Room

Meet the EPIC-AI core research team: our PhD fellow and postdoctoral researcher leading the day-to-day work (Naim from April 2025, and Haukur from September 2025).



Naimahmed Nesaragi

POSTDOC • RIKSHOSPITALET

With expertise in signal processing and deep learning, Naim focuses on physiological time-series analysis and its application in critical care.



Haukur Tyr Gudmundsson

PHD FELLOW • ANAESTHETIST • ULLEVÅL SYKEHUS

Bridging the gap between clinical practice and machine learning. A long-time AI enthusiast with slightly above-average computer skills for an anaesthetist.

UNDER THE GUIDANCE OF

INTENSIVE CARE MEDICINE

Prof. Kjetil Sunde
PRINCIPAL INVESTIGATOR
Anesthesia & Intensive Care, OUS

Dr. Henning Wimmer
INTENSIVIST
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Greetings from the EPIC-AI team.

We look forward to sharing our first results by late 2026 and remain warmly open to new collaborative opportunities.



epic-ai.org

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