Dr Alexander D. Shaw: Neurocomputational Consulting

Bridging Neuroscience, Psychiatry & AI through Mechanistic Modelling

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About

Alex is a neuroscientist, AGI researcher and computational psychiatrist at the University of Exeter. He leads the *Computational Psychiatry & Neuropharmacological Systems (CPNS) Lab* and serves as Director of Business Engagement & Innovation for Psychology. His work combines **dynamical systems** modelling with **Variational Bayes**/**Laplace** inference to explain brain function, neuropharmacology, cognition and disease. He develops open-source tools used internationally for **Dynamic Causal Modelling**, **active inference**, predictive coding, and optimisation-driven modelling.

Computational Psychiatry • Dynamic Causal Modelling • Variational Bayes/Laplace • Dynamical Systems • Optimisation • Active Inference

Core Services

Strategic & Translational Advisory

- Mechanistic biomarkers & experimental design (CNS)
- Translational neuroscience & cross-species modelling
- Technical due diligence for neuro/AI start-ups
- IP evaluation & R&D road-mapping

Neurocomputational Modelling & Analysis

- State-space & dynamical systems models
- Dynamic Causal Modelling & Dynamic Expectation Maximisation
- Variational Bayesian methods & related pipelines
- Optimisation, model selection & ablation studies
- Biomarker discovery & mechanism-of-action inference

Neuro-AI & Predictive Systems Consulting

- Active inference & predictive coding algorithms
- Generative model architectures for agents
- Free-energy minimisation & Bayesian RL
- Neuro-inspired frameworks for AGI research
- Code review

Applied Assays & Analytics

- Functional drinks neuro-assays: EEG/behavioural endpoints
- Clinical imaging analyses: EEG/MEG/fMRI $\rightarrow$ biomarkers
- Marketing/product testing: neurocognitive metrics & A/B neuro-analytics
- Wearables & real-world sensing for longitudinal insight

Training & Knowledge Translation: Workshops (computational psychiatry, DCM & active inference), CPD modules, masterclasses on predictive coding & brain modelling.

Example Projects

Active inference for adaptive AI systems
Predictive coding architectures and free-energy-based control for intelligent agents under uncertainty.

EEG biomarkers across psychiatric disorders
Mechanistic modelling of sleep & task EEG to identify computational biomarkers for diagnosis, stratification, and treatment response.

Modelling GABAergic modulation in human EEG
Inferring receptor-level dynamics and oscillatory changes from pharmacological manipulation to guide development and safety.

Neuro-informed product & creative testing
Lightweight EEG/behaviour protocols and model-based metrics for attention, engagement, and decision-making.

Engagement & Pricing

Advisory
High-leverage strategy or technical consults.

£250–£600 *per session*
1–2 hr call • Summary report • Reading list / next steps

Project-Based
Bespoke analysis or modelling with deliverables.

£2,000–£10,000 *per project*
Scope/milestones • Reproducible code & figures • VB/Laplace fitting & comparison • Mechanistic interpretation & briefing • Technical report & docs

Retainer
Ongoing collaboration and technical advisory.

£1,500–£3,000 *per month*
Guaranteed availability • Pipeline design & oversight • Monthly reporting

Independent consultancy or via University of Exeter (130% FEC). NDAs and IP assignments supported.