

#BioEP: Providing Decision Support for Epilepsy Diagnosis and Prognosis

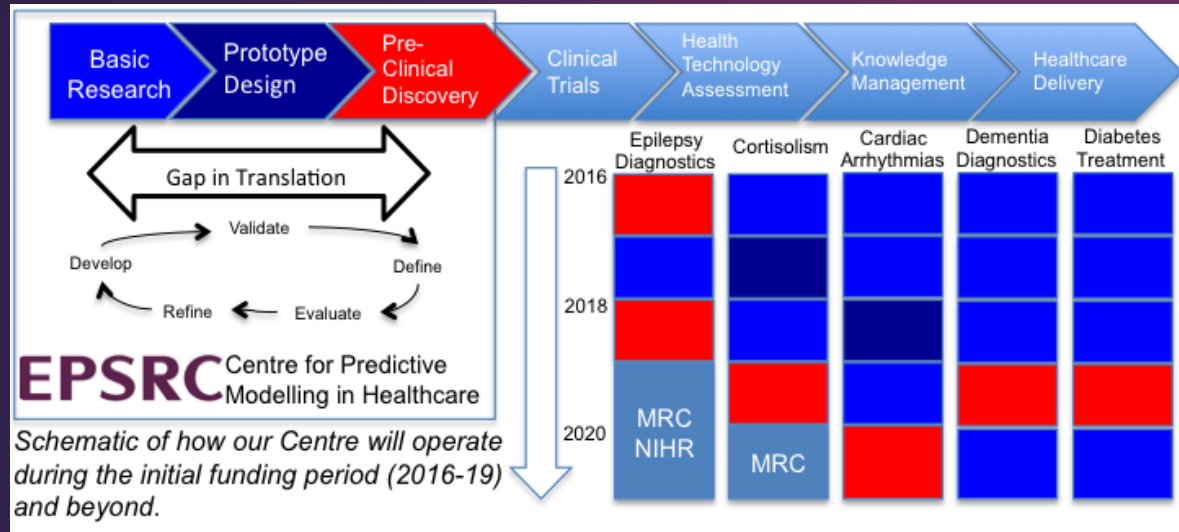
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Revolutionizing the epilepsy treatment pathway

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#Maths4Health @ University of Exeter



- Develop advanced mathematical models for understanding dynamic chronic health conditions
- Partner with clinicians and industry to translate fundamental research into decision support tools
- Focus on neurological conditions, cardiology, diabetes and endocrinology

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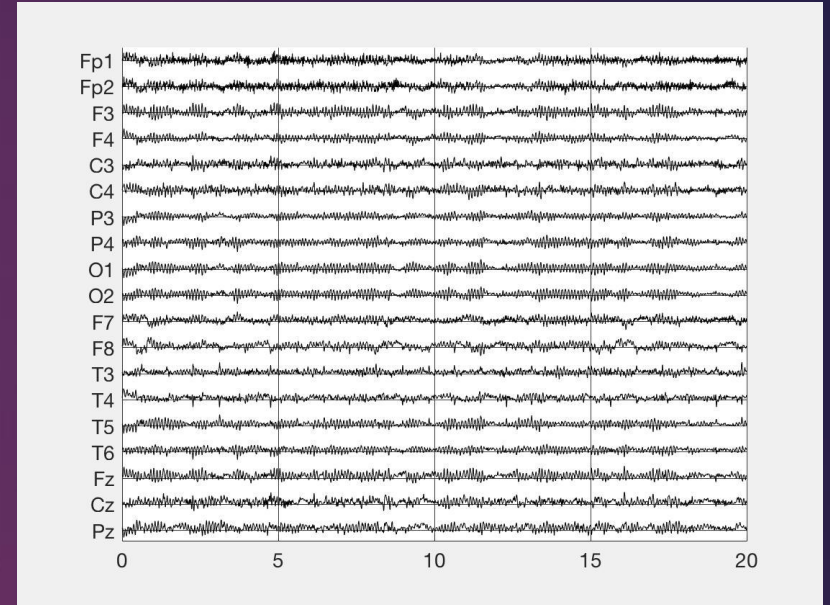
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Clinical Need for BioEP

- Standard EEG analysis ineffective discriminator:
 - 350,000 people have inconclusive initial EEGs annually in US & Europe
- Typical time to diagnosis:
 - \approx 9-12 months in specialist settings
- Misdiagnosis is common:
 - 23% in non-specialist settings
- Annual cost of misdiagnosis:
 - \approx \$1-\$4 Billion in the US alone



Current Alternatives

Long-Term Monitoring

Advantages

- Certainty
- Gold Standard (with video)

Disadvantages

- Impractical
- Invasive
- Expensive
- Time consuming
- Delays treatment
- Stigma
- Risk



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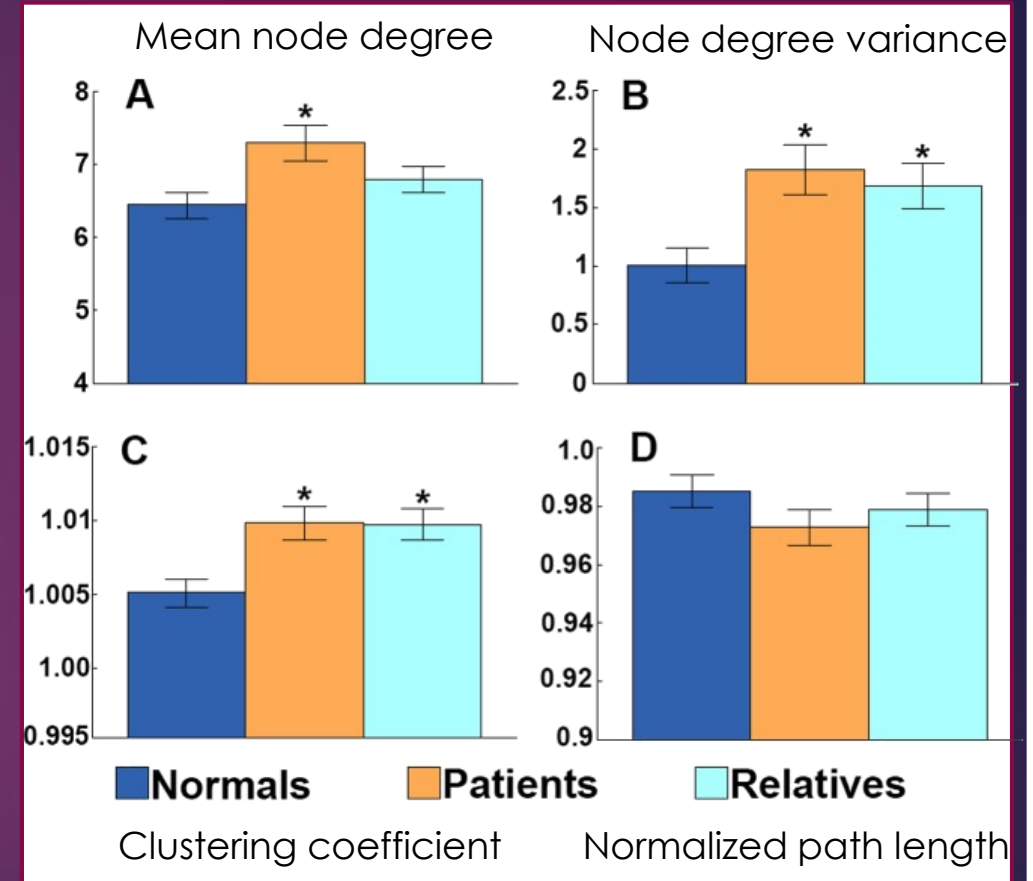
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The BioEP Solution

- Patent-pending in USA/Europe/China/India
- Builds on world-leading research into network based mechanisms of seizures
- Lancet Neurology breakthrough study in epilepsy 2014



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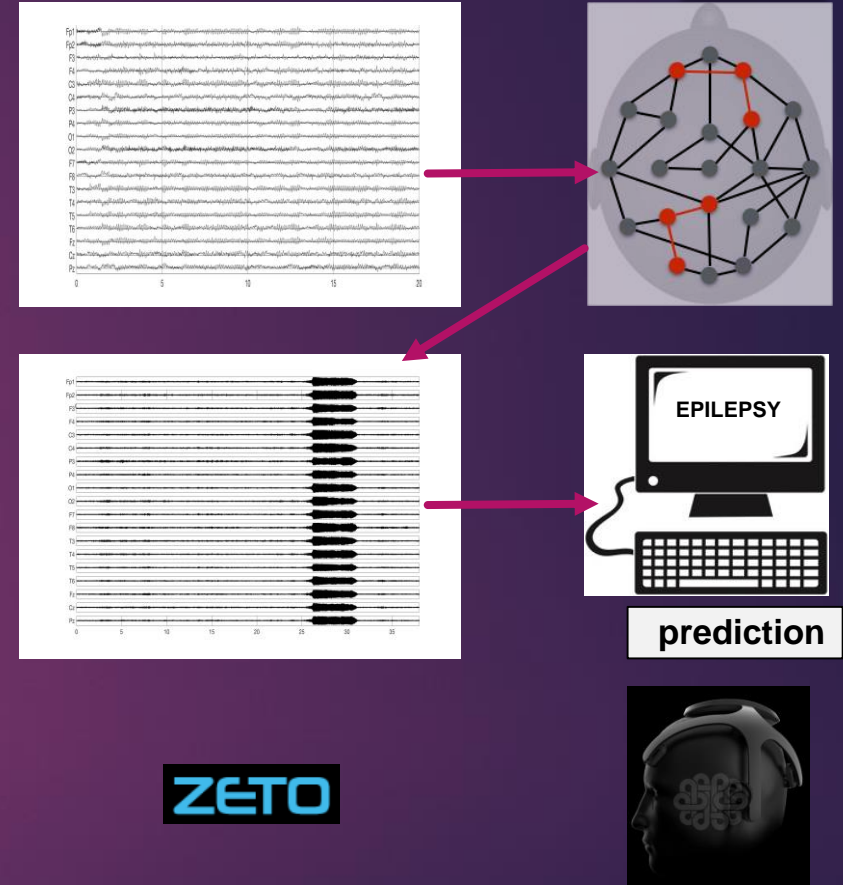
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The BioEP Solution

- A disruptive technology using only background EEG **NOT** observing seizures
- BioEP is a measure of seizure likelihood using computer simulations
- Prediction fed back to primary care or clinic
- Provide real-time information to people with epilepsy in conjunction with wireless headset



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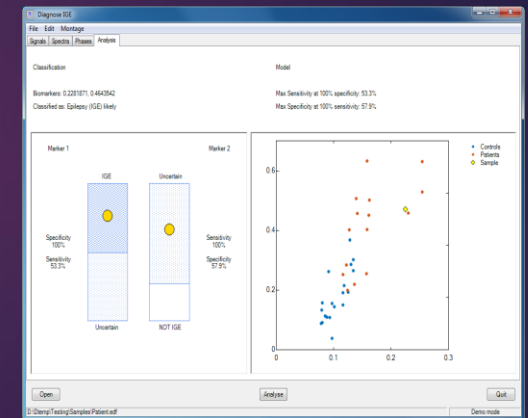
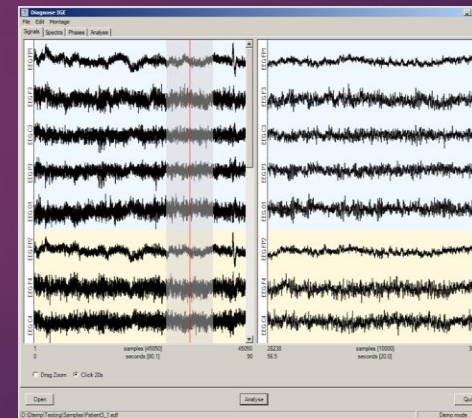
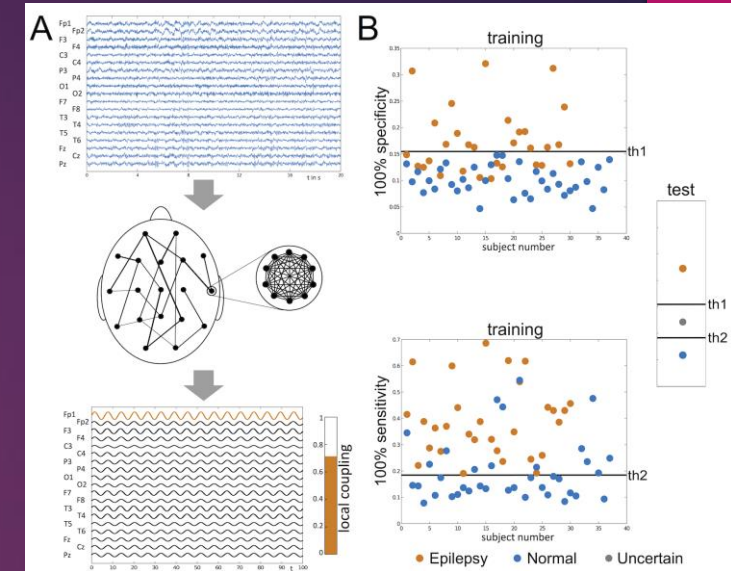
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Current Progress

- Proof of concept:
 - Non-epilepsy: 80 people
 - Relatives: 40 people
 - IGE: 30 people (Epilepsia **57**: e200 2016)
 - Focal: 35 people (under review)
- Over 100 people engaged
- Health economic assessment:
 - £625 per person savings to UK NHS
- Finalist in Epilepsy Foundation “SharkTank” contest 2017 - \$5000 prize

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Next Steps

1. Data architecture and Infrastructure
- ↓
2. Create a clinically representative database
- ↓
3. Develop prototype software as a service (SaaS)
- ↓
4. Perform clinical trial for diagnosis and prognosis
- ↓
5. Seek regulatory approval (CE, FDA 510(k))
- ↓
6. Product launch

Likelihood ratio: 21.5

