

Docket #: S19-190

Morphing Electronics for Implantable Neurological Devices Compatible with Growing Tissue

The Bao research group has developed new morphing electronics (MorphE) materials for stretchable nerve stimulators. Intended to help treat neurological diseases, MorphE contains a soft conductor and a viscoplastic polymer which allows the material to easily deform and still retain its electronic function. Each implant can be customized with individual implantation procedures due to the water insensitive and self-healing nature of MorphE. In vivo studies showed that placement of MorphE around the sciatic nerve in adolescent mice "grew" as the nerve developed to form a stable functional interface for chronic nerve stimulation and monitoring. Relative to current cuff implants, MorphE did not hinder nerve function and thus is ideal for pediatric and adolescent patients.



Photo description: Conduction velocity of MorphE vs cuff electrode and no implant. Picture of MorphE vs the cuff electrode implant after 4 weeks of nerve growth. Ref: Liu et al. Nature Biotechnology (2020).

Stage of Research

- in vivo studies

Applications

- **Implantable neurological electronic devices**
 - Deep brain stimulators
 - Vagus nerve stimulators
- **Pediatric and adolescent patients**

Advantages

- **Grows to accommodate underlying tissue development**
 - Reduces frequency of repeat surgeries
 - No hinderance on nerve development
- **Zero-stress during stretch**

Publications

- Liu et. al. Nature Biotechnology (2020) [Morphing electronics enable neuromodulation in growing tissue](#)

Patents

- Published Application: [20210299437](#)

Innovators

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