

# **Reliable Neural Interfaces - A Multidisciplinary NeuroEngineering Grand Challenge**

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## **Technical Abstract:**

Although the field of brain-machine interfaces (BMIs) is exciting and appears to have great potential, there are two fundamental and well-known obstacles that will prevent BMIs from being deployed widely and with great success until they are addressed head on and solved. Both problems deal with reliability. A well-meaning prosthetic will be discarded by the user if it cannot function with a very high level of reliability (e.g., if a prosthetic leg only functioned with 99% reliability, which would cause the user fall down once every 100 steps, it would quickly be discarded for the reliability of a wheelchair). That fact that the BMI community cannot control a simple 1-bit switch with very high reliability, does not bode well for more ambitious implementation goals. Indeed, it would be hard to make a reliable digital circuit of any complexity if one could not even produce a reliable inverter. In this talk I will outline what I see as the fundamental reliability problems (i.e., the physical microscale interface and the algorithm and system-design level) and possible strategies for address them.