Neuroprosthetics Symposium
Introduction

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Financial Disclosure

• I have no financial conflicts to disclose.
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Neuroprosthetics

• Technologies utilizing spared spinal/brain circuits to augment or replace sensorimotor functions\(^1\)

• A variety of technologies applicable to several diseases\(^2\) however, this symposium will focus on implantable machine-nerve interfaces after amputation.
Challenges for Upper Limb Myoelectric Prostheses

- 23% abandonment rate\(^3\)
- Only 1-3 degrees of freedom\(^4\)
- Lack of haptic (tactile) feedback
- Signal quality\(^4,5\)
  - Superficial Muscles
  - Adjacent Muscles
  - Noisy Signals
  - Variable skin impedance (perspiration)
Pertinent Clinical Challenges for Lower Limb Amputees

• Skin breakdown
• Residual Limb Pain\(^6\)
  o Neuromas
  o Phantom Limb Pain
• Falls\(^7\)
Electroneurographic Interface (ENG)

- Direct communication between device and peripheral nervous system
- Sensory feedback
  - Electrotactile
  - Vibro-Tactile
  - Modality Matched
  - Invasive Stimulation
Implantable Interfaces

• Extraneural
• Intrafascicular (i.e. Utah Slanted Electrode Array)
• Reconstructed Peripheral Nerve Interfaces (RPNIs)
References

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