Neuroprosthetics

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Motivation
State of the Practice
Revolutionizing Prosthetics
From Hook to Hand: Critical Challenges

Control (human → prosthesis)

Feedback (prosthesis → human)
Problem Statement – Control
Problem Statement – Feedback

Modular Prosthetic Limb v2.0 Tele-operation
Neural Integration
Use Case – Transradial Amputee
Transradial Electromyography

Jon Kuniholm with Intrinsic Hand
Myoelectric Control Using Pattern Recognition
Use Case – Shoulder Disarticulation Amputee

Kuiken et al., PNAS, 2007
TMR Electromyography

Patient S1
JHUAPL Arm System
Use Case – Paralysis

Neural control

Motor behaviour

Musculoskeletal mechanics

Nature Reviews | Neuroscience

University of Pittsburgh Medical Center
Closed-Loop Cortical Control

Normann, Nature Clinical Practice Neurology, 2007
Next steps in Brain-Computer Interfaces
Thank You!