IEEE Transactions on Neural Systems and Rehabilitation Special Issue:

Broadening the Impact of the DARE Conference: Transformative Opportunities for Modeling in Neurorehabilitation

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SOLICITATION FOR PAPERS

Recent advancements in computational modeling have created new avenues for enhancing clinical diagnosis and treatment in the field of neurorehabilitation. Computational models, defined broadly here as relationship equations used to model neural mechanisms or behavioral observations in the context of neurorehabilitation, can be based on theories of nervous system function (e.g., Hebbian plasticity, motor learning, optimal control theory), leverage data-driven (i.e., model-free) approaches, or combine the two frameworks. Such models hold transformative potential for understanding, predicting, and optimizing recovery and rehabilitation of neurologic disorders. However, model development is an ongoing challenge due to the need to accurately represent complex human systems, devices, rehabilitation processes, and their interactions. Robust development and validation of these models are critical for translating data into functional and effective neurorehabilitation strategies.

We invite researchers and practitioners from diverse domains—such as neuroscience, biomedical engineering, computer science, and clinical practice—to contribute papers that explore the theoretical developments, technological innovations, and experimental validations of computational modeling applied to the field of neurorehabilitation.

Papers are solicited on all aspects of computational modeling for neurorehabilitation, including but not limited to:

- Sensorimotor Adaptation: Including co-adaptation between humans and devices (e.g., assistive devices).
- Sensory Perception: Modeling pain perception and sensory integration.
- Neuroplasticity: Understanding and modeling changes in neural pathways.
- Musculoskeletal Modeling: Modeling and design of rehabilitation and/or assistive devices such as adaptive soft robotics and exoskeletons.
- Data-driven Modeling and Machine Learning: Developing optimal dynamic treatment approaches leveraging AI and ML techniques.

Timeline:

Deadline for paper submission – June ‘2025
Completion of First Review – September ‘25
Completion of Final Review – November ‘25
Submission of Final Manuscripts – January ‘26
Publication – February ‘27