**Transfer functions overview:**

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4230754/>

Elias LA, Watanabe RN, Kohn AF. Spinal mechanisms may provide a combination of intermittent and continuous control of human posture: predictions from a biologically based neuromusculoskeletal model. PLoS computational biology. 2014 Nov 13;10(11):e1003944.

* This study uses a large-scale neuromusculoskeletal (NMS) model to investigate the neuromuscular mechanisms behind human upright stance control, incorporating spinal neuron models, muscle proprioceptors, Hill-type muscle models, and an inverted pendulum body model. The model includes transfer functions for Golgi tendon organs (GTO) and muscle spindles, providing sensory feedback for control.

<https://pubmed.ncbi.nlm.nih.gov/30482333/>

Forbes PA, Chen A, Blouin JS. Sensorimotor control of standing balance. Handbook of clinical neurology. 2018 Jan 1;159:61-83.

* This review discusses the biomechanics and sensory dynamics of standing balance, exploring how sensory cues are integrated to maintain stability. It highlights sensorimotor, computational, and robotic approaches to understanding balance control, emphasizing the task dependency, multisensory integration, and contributions of cortical-subcortical processes. The paper also includes transfer functions for vision, proprioception, and vestibular senses, providing a detailed account of how these systems contribute to balance control.

**Spindles:**

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10841431/>

Abbott EM, Stephens JD, Simha SN, Wood L, Nardelli P, Cope TC, Sawicki GS, Ting LH. Attenuation of muscle spindle firing with artificially increased series compliance during stretch of relaxed muscle. Experimental Physiology. 2024 Jan;109(1):148-58.

* This study investigates how added tendon compliance affects muscle spindle firing, revealing that while compliance generally reduces firing rates, the effects vary across different stretch types and cannot be fully explained by changes in muscle fascicle length, velocity, or muscle-tendon unit force.

<https://pubmed.ncbi.nlm.nih.gov/37428622/>

Simha SN, Ting LH. Intrafusal cross‐bridge dynamics shape history‐dependent muscle spindle responses to stretch. Experimental Physiology. 2024 Jan;109(1):112-24.

* This study presents a biophysical muscle spindle model that predicts sensory signals during stretch, showing how myosin dynamics and inter-filament interactions influence receptor potentials, initial bursts, and recovery, with implications for understanding muscle spindle function in postural sway and locomotion.

<https://pubmed.ncbi.nlm.nih.gov/33370235/>

Blum KP, Campbell KS, Horslen BC, Nardelli P, Housley SN, Cope TC, Ting LH. Diverse and complex muscle spindle afferent firing properties emerge from multiscale muscle mechanics. Elife. 2020 Dec 28;9:e55177.

* This study presents a biophysical model demonstrating how muscle spindle afferent firing patterns, including movement history dependence and nonlinear velocity scaling, arise from muscle contractile mechanics and neuromechanical interactions, offering a framework to predict proprioceptive signals during active muscle contraction and stretch.

**Vestibular:**

<https://open.library.ubc.ca/soa/cIRcle/collections/ubctheses/24/items/1.0435115>

Chen A. Physiological computations underlying our internal representation of vestibular self-motion (Doctoral dissertation, University of British Columbia).

* This thesis explores how the brain processes vestibular sensory information, revealing that perception of self-motion is shaped by past experiences and can be elicited through both mechanical and electrical vestibular stimuli, offering new insights into vestibular processing and sensory integration.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4388918/>

Schneider AD, Jamali M, Carriot J, Chacron MJ, Cullen KE. The increased sensitivity of irregular peripheral canal and otolith vestibular afferents optimizes their encoding of natural stimuli. Journal of Neuroscience. 2015 Apr 8;35(14):5522-36.

* This study reveals that vestibular afferents in rhesus monkeys exhibit nonlinear responses to natural rotational and translational stimuli, supporting the hypothesis that vestibular neural coding strategies are optimized to match the statistics of natural sensory input.

**Skin:**

<https://pubmed.ncbi.nlm.nih.gov/36636355/>

Katic N, Siqueira RK, Cleland L, Strzalkowski N, Bent L, Raspopovic S, Saal H. Modeling foot sole cutaneous afferents: FootSim. Iscience. 2023 Jan 20;26(1).

* The FootSim model simulates mechanoreceptor activation in the foot sole to replicate neural spiking responses to mechanical stimuli, providing insights into afferent activation under dynamic conditions and serving as a valuable tool for neuroprosthetic applications and biomimetic stimulation design.

**Vision:**

<https://doi.org/10.1162/artl_a_00297>

Fu Q, Wang H, Hu C, Yue S. Towards computational models and applications of insect visual systems for motion perception: A review. Artificial life. 2019 Aug 1;25(3):263-311.

* This article reviews computational models of motion perception derived from insect visual systems, highlighting their applications in artificial intelligence and robotics, and discusses the methodologies for achieving direction and size selectivity in these models, along with their integration and hardware implementation.

<https://jov.arvojournals.org/article.aspx?articleid=2677957>

Perrone JA. Visual–vestibular estimation of the body's curvilinear motion through the world: A computational model. Journal of Vision. 2018 Apr 1;18(4):1-.

* This study demonstrates that accurate navigation during curvilinear self-motion requires precise measurement of eye-in-world rotation, showing that combining imprecise vestibular signals with visual image-motion velocities enhances heading estimation accuracy and aligns with existing psychophysical data.