



# Awarded COFAS Marie Curie fellows – For the FIIP programme



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Centre for Musculoskeletal Research, University of Gavle, Sweden

## **Project: Motor Variability in Occupational Work: Determinants & Physiological effects**

**Abstract:** Extended periods of work with monotonous, repetitive movements is a potent risk factor for musculoskeletal disorders in the neck, shoulder and arm regions. Repetitive movements occur in many occupations, and more ‘variation in biomechanical exposure’ is often suggested as an effective intervention in these settings.

Organizational interventions to increase variation through initiatives such as job rotation may not always be feasible. In such cases, the intrinsic variability of the human movement system offers an alternative approach to increase variation. ‘Motor variability’ (MV) refers to the natural variation observed to different extents in all movements.

The present project pursues a number of basic questions regarding MV in an occupational context. Is MV affected by common work factors such as work pace, precision demands, workstation design and different combinations of mental and physical loads? Is it possible to manipulate these factors so as to produce more variable movements without loss in productive performance? Will a changed MV lead to positive physiological effects?

Since there are no standard methods to quantify MV in occupational settings, the project first aims to develop operational methods to measure important elements of MV. Then, it will assess if MV is affected by the external work factors mentioned above, and if different patterns of MV correlate with important outcomes such as fatigue and performance.

The studies are conducted in a laboratory-based setup of a repetitive pipetting task, with people experienced in pipetting. Their hand-arm kinematics, muscle activity from the shoulders and lower arm, and objective signs and subjective ratings of fatigue, pain and performance will be collected. This work is being performed at the Centre for Musculoskeletal Research in Sweden, in collaboration with researchers at the University of Michigan, USA, and Aalborg University, Denmark.

**Career plan:** My primary areas of interest are in motor control and biomechanics. This project is an opportunity to apply my engineering and motor control background to: (i) develop new research methods for physiological assessments in working life, and (ii) Apply theoretical findings from controlled lab-settings to develop solutions (interventional or rehabilitative) to problems/risks in working life.

It is also an excellent opportunity for me to learn to coordinate between multiple disciplines of research, and intellectually benefit from and contribute to all of them, while at the same time forging an independent identity for my future research career.

This project fosters healthy interaction and collaboration between my future position in a US-based institution like the University of Michigan and two European strong-holds in the areas of ergonomics and musculo-skeletal disorders related to working life, Centrum för belastningsskadeforskning (CBF) and the Center for Sensory Motor Interaction (SMI).