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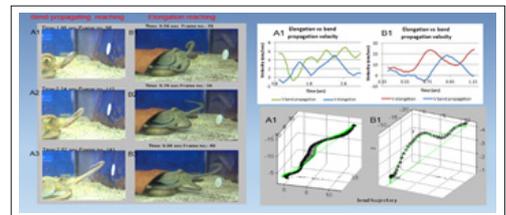


## Shlomi Hanassy

Hanassy R&D Ltd., Israel

### Introduction to octopus arm motor control neuro-biology and biomimetics

Octopuses were always a fascinating animal with their spectacular line of unique features. Here we will review many of those features focusing on the arm motor control. Similar to tongue and the elephant trunk, the octopus arm is a muscle hydrostat, hyper-redundant structure. The computational process involved in the generation of a movement in such structure is a highlight for motor control engineers. During that process, a reduction of the motor control problem complexity is obtained by reducing degrees of freedom, using stereotypical motor primitives, which are simply modulated instead of calculated, to achieve the required movement. That principle inspired many robotic engineers to achieve a new kind of control: embedded intelligence. Here we will present some results of such bio-robotic engineering and novel applications.



Development of techniques for extracting motor primitives of local movements.

### Recent Publications

1. S Hanassy, A Botvinnik, T Flash, B Hochner (2015). Stereotypical reaching movements of the octopus involve both bend propagation and arm elongation. *Bioinspiration & biomimetics* 10 (3), 035001.
2. I Zelman, M Titon, Y Yekutieli, S Hanassy, B Hochner, T Flash (2013). Kinematic decomposition and classification of octopus arm movements. *Frontiers in computational neuroscience* 7, 60.
3. S Levy-Tzedek, S Hanassy, S Abboud, S Maidenbaum, A Amedi (2012). Fast, accurate reaching movements with a visual-to-auditory sensory substitution device. *Restorative neurology and neuroscience* 30 (4), 313-323.

### Biography

Shlomi Hanassy is the owner and establisher of Hanassy R&D Ltd. IL. Shlomi is an algorithm developer and neurobiologist specialized in motor control and vision processing. He is also an inventor and experienced developer of several innovations in those fields. In 2011-2012 he worked as algorithm developer at Wellsense tech (<http://www.wellsense-tech.com/>), developing algorithms for pressure mat while serving as a consultant for the EU "Stiff-flop" project (<http://www.stiff-flop.eu/>). During 2007-2010 he was a Phd student and algorithm developer of visual substitution devices at Amir Amedi's lab for higher brain functions while serving as a co-worker in Benny Hochner's lab for motor control and at the EU "Octopus project" (<http://www.octopusproject.eu/>). Since 2007 Shlomi is holding an M.sc in medical neurobiology from the Hebrew University (Hadassah Ein Carem medical school) and a B.A in computer science and administration from the Open University of Israel (since 2003).

[shlomo.hanassy@gmail.com](mailto:shlomo.hanassy@gmail.com)