

## 16-899: Reference list for Monday, Feb 1<sup>st</sup>

Our main focus was on the following paper and its method for optimizing gripper structure, including tendon routing and stiffnesses.

Ciocarlie M, Hicks FM, Holmberg R, Hawke J, Schlicht M, Gee J, Stanford S, Bahadur R. The Velo gripper: A versatile single-actuator design for enveloping, parallel and fingertip grasps. The International Journal of Robotics Research. 2014 Apr 1;33(5):753-67.

<http://ijr.sagepub.com/content/33/5/753.full.pdf>

<https://www.youtube.com/watch?v=rtj3fuHrCDU>

The following paper takes a different approach, beginning with a high DoF gripper and reducing joint range of motion and degrees of freedom until a dataset of grasps can no longer be effectively achieved.

Hammond III FL, Weisz J, De la Llera Kurth AA, Allen PK, Howe RD. Towards a design optimization method for reducing the mechanical complexity of underactuated robotic hands. In Robotics and Automation (ICRA), 2012 IEEE International Conference on 2012 May 14 (pp. 2843-2850). IEEE.

[http://www.cs.columbia.edu/~allen/PAPERS/hammond\\_icra12.pdf](http://www.cs.columbia.edu/~allen/PAPERS/hammond_icra12.pdf)

<http://www.franklhammondiii.com/research/robotic-hand-design.html>

In this paper, the authors optimize the size of an in-hand workspace for a given grasp.

Borràs J, Dollar AM. Dimensional synthesis of three-fingered robot hands for maximal precision manipulation workspace. The International Journal of Robotics Research. 2015 Dec 1;34(14):1731-46.

<http://ijr.sagepub.com/content/34/14/1731.full>

The following two papers are earlier work on optimizing underactuated hands. They contain a discussion of the “ejection phenomenon” and an analysis of circumstances under which it will and will not occur.

Birglen L, Gosselin C. Optimal design of 2-phalanx underactuated fingers. In Proceedings of the 2004 International Conference on Intelligent Manipulation and Grasping, Genova, Italy 2004 Jul 1 (pp. 110-116).

[http://www.professeurs.polymtl.ca/lionel.birglen/Shared/IMG04\\_Birglen-Gosselin.pdf](http://www.professeurs.polymtl.ca/lionel.birglen/Shared/IMG04_Birglen-Gosselin.pdf)

Birglen L, Gosselin CM. Geometric design of three-phalanx underactuated fingers. Journal of Mechanical Design. 2006 Mar 1;128(2):356-64.

<http://www.polymtl.ca/labrobot/pdf/JMD2006.pdf>