

# Kinetic energy fluctuation helps animals and robots self-right on the ground

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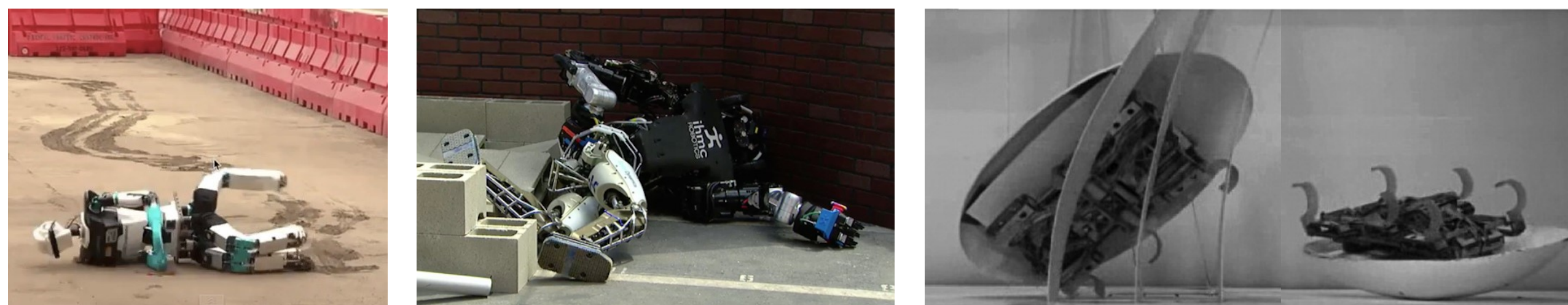
<https://li.me.jhu.edu>

Othayoth, Xuan, Li, *eLife*, in prep.

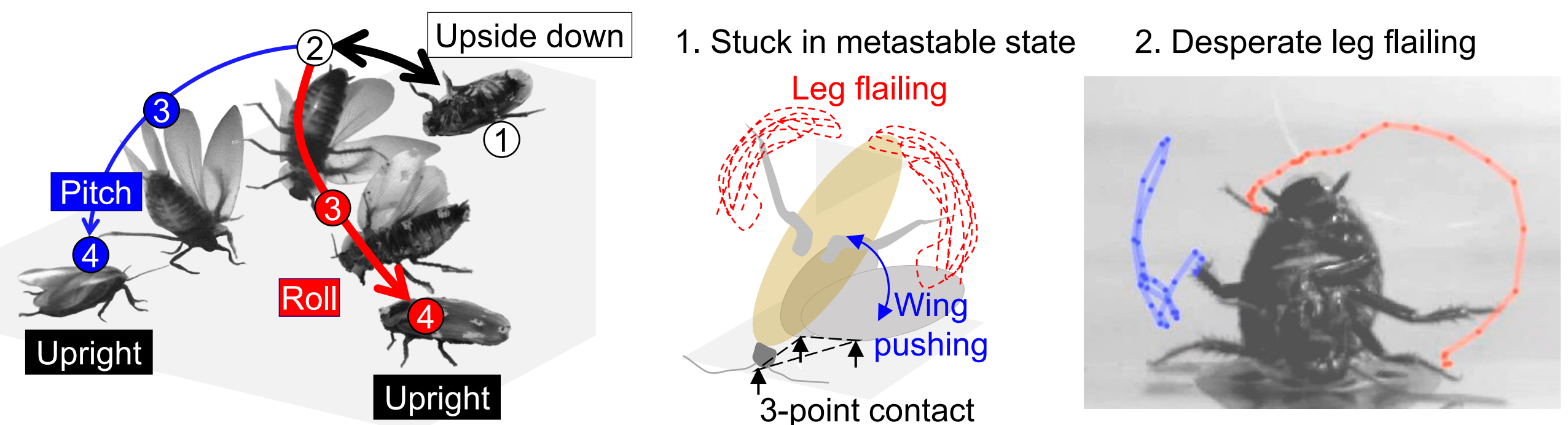


## 1. Background & Motivation

Self-right is critical during locomotion in complex terrain

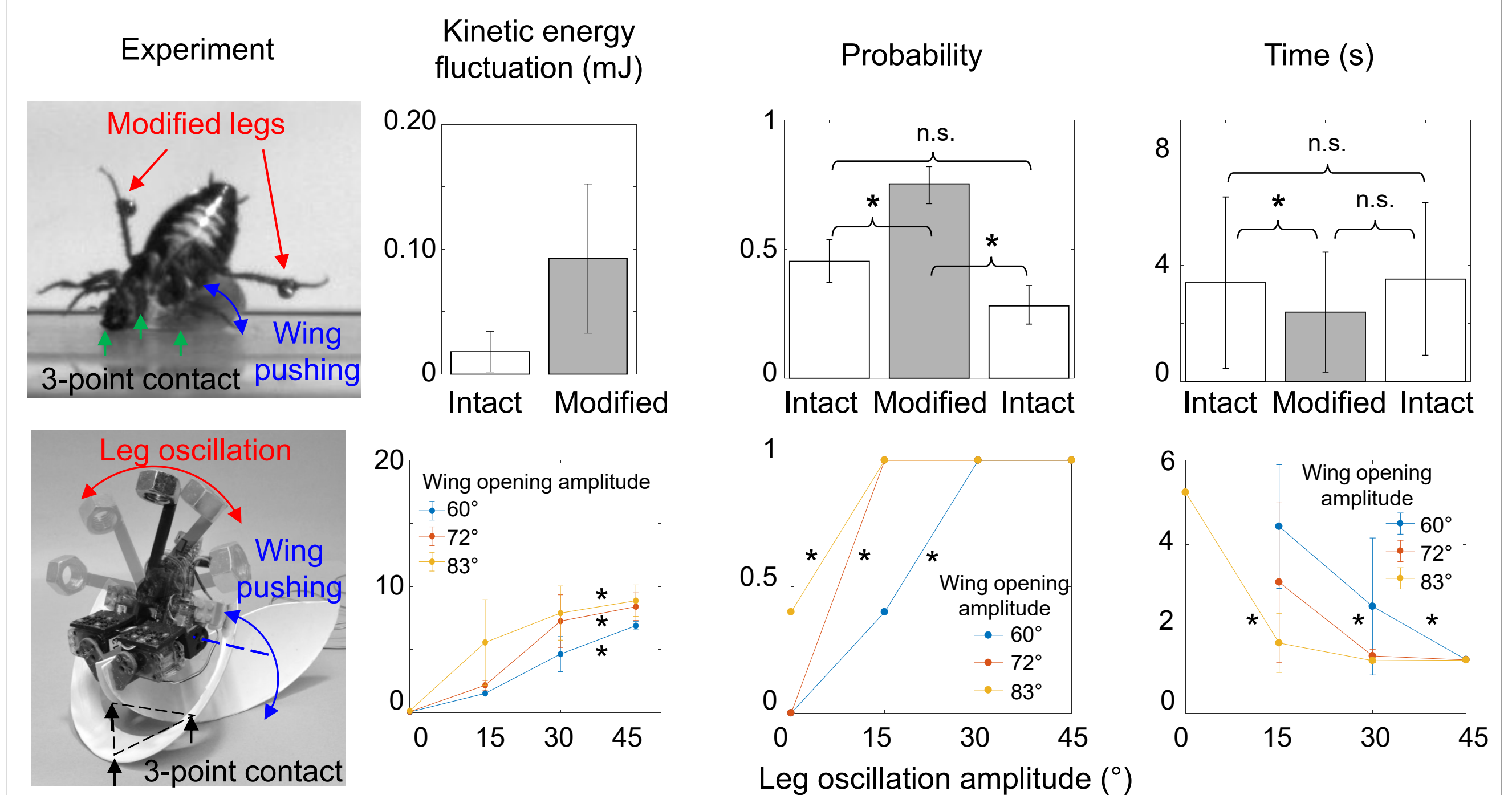


Cockroaches self-right using wings, but has seemingly wasteful leg flailing

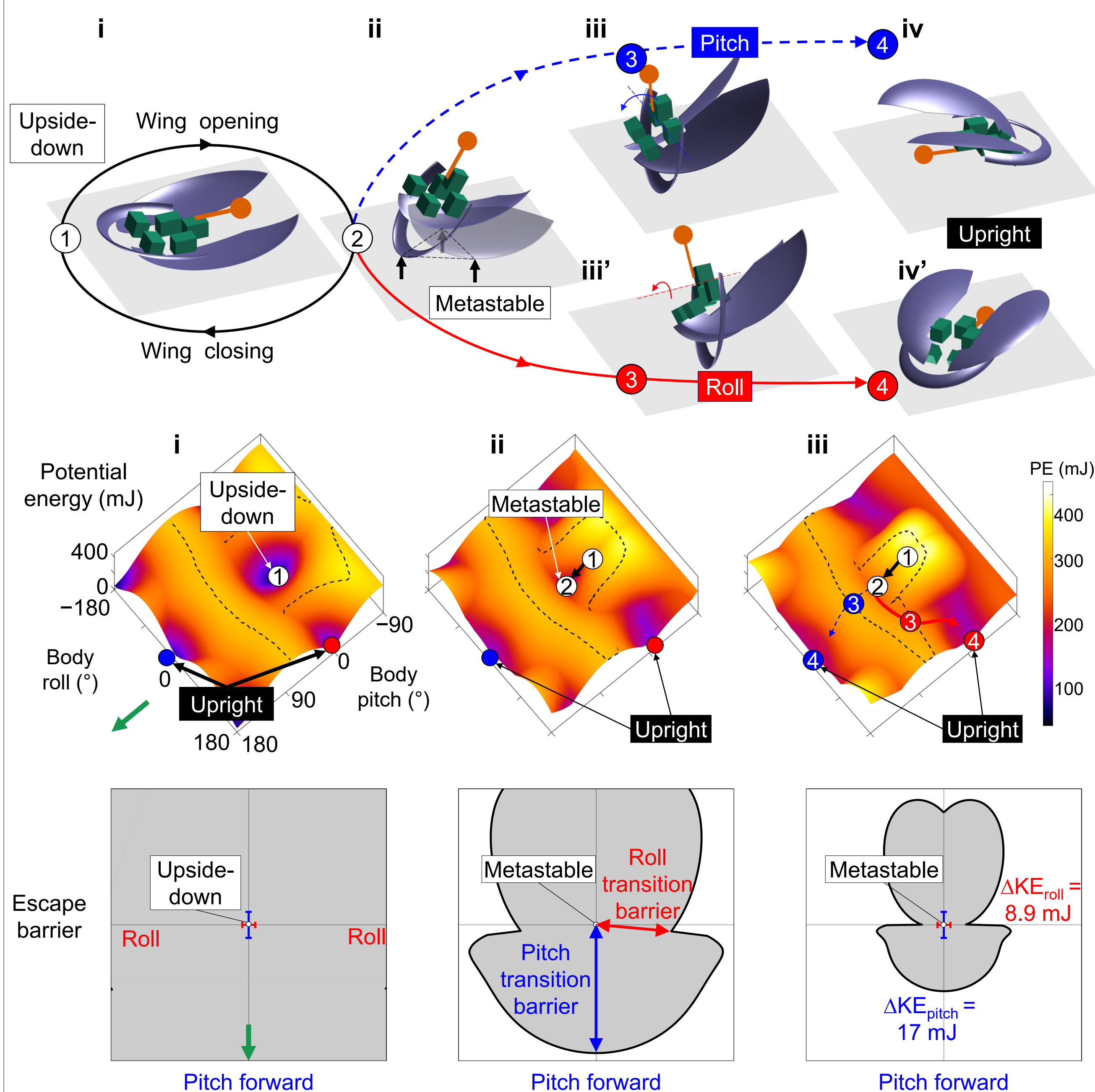


## 2. Methods & Results

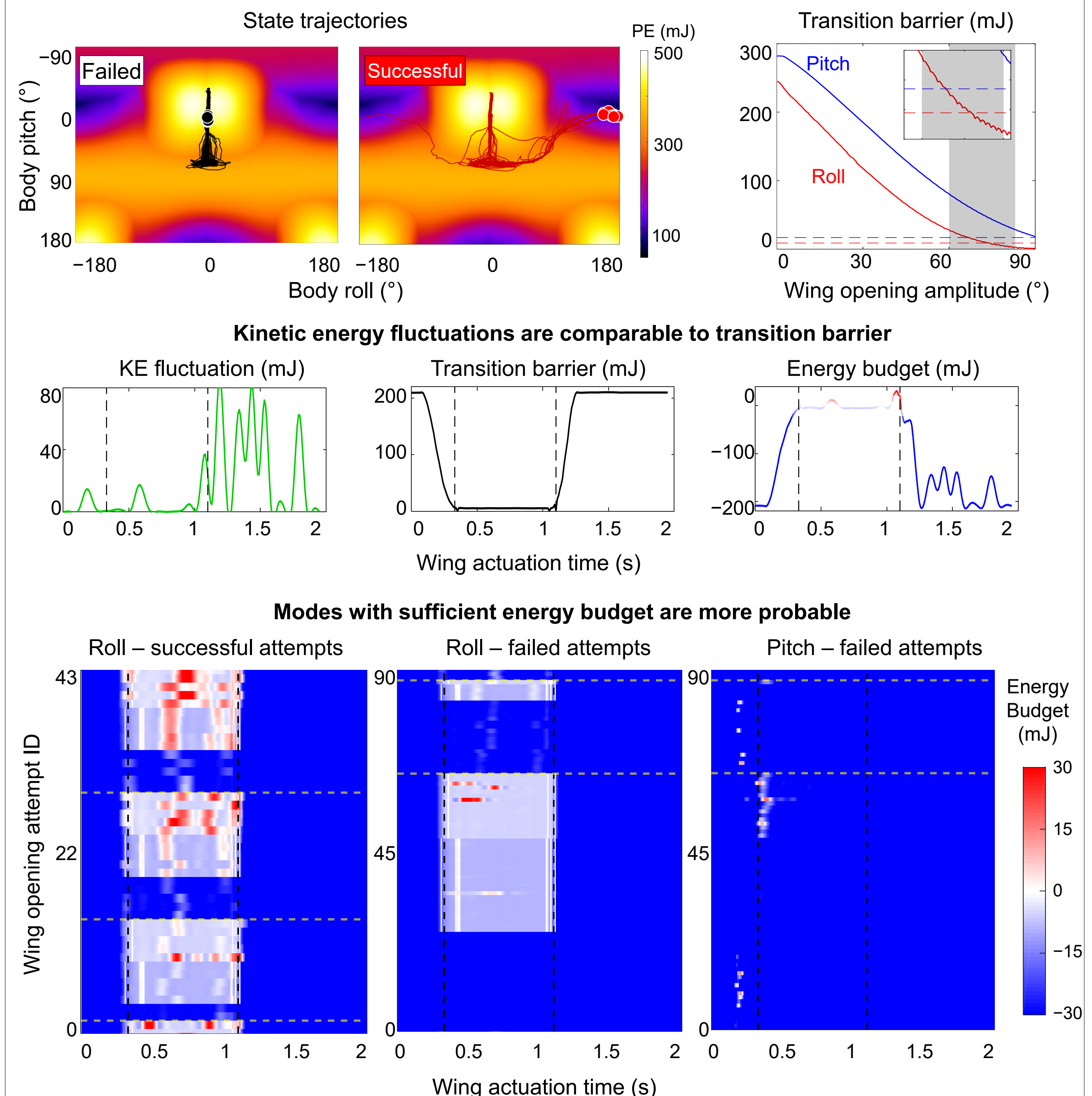
Increased kinetic energy fluctuation → Higher self-righting performance



## 3. Energy Landscape Modeling



## 4. Energy Budget Analysis



### Take-home messages

- Wing pushing alone cannot result in self-righting
- Seemingly wasteful leg flailing provides kinetic energy fluctuation to overcome barriers on energy landscape
- Energy landscape model revealed that modes with sufficient energy budget are more likely to occur

### Acknowledgements

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