

# Patrick Slade

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## Education

**Stanford University, NSF GRFP and SGF Fellow**

MS Mechanical Engineering, Dec. 2017

PhD Mechanical Engineering, Expected: June 2021

Advisor: Mykel Kochenderfer (SISL Lab)

**University of Illinois at Urbana-Champaign,**

BS Mechanical Engineering, May 2016

GPA: 3.98 / 4.00

## Experience

**SISL Lab** — Stanford, CA

*Graduate Research Assistant – Professor Mykel Kochenderfer (Jan. 2017 – Current)*

- Developing rapid energy expenditure estimation models to allow optimization of assistive devices and rehabilitation programs (AI Grant funded)
- Researching simultaneous control and estimation for human-robot systems

**CHARM Lab** — Stanford, CA

*Graduate Research Assistant – Professor Allison Okamura (Sept. – March 2017)*

- Designed soft endoscope for neurosurgery

**Biodesign Lab, Harvard REU** — Cambridge, MA

*Undergraduate Research Assistant – Professor Conor Walsh (June – Aug. 2015)*

- Designed and manufactured active knee exosuit to assist uphill walking
- Real-time, adaptive controller for gait analysis and sensor processing in C

**PSYONIC** — Champaign, IL

*Co-founder (July 2014 – Sept. 2016)*

- Startup for advanced prosthetic hands with sensory feedback at 10x less cost than current devices
- Raised \$300k+ (NSF SBIR Phase I, Cozad New Ventur, Samsung Innovation Prize, NSF I-CORPS)
- Mechanical design and controls for production of prosthetic device

**Bretl Research Group** — Champaign, IL

*Undergraduate Research Assistant – Professor Timothy Bretl (Oct. 2013 – Aug. 2016)*

- Haptic sensory feedback design and testing: skin stretch, vibrotactile, electrotactile
- Designed hand prosthesis with state-of-the-art performance for 1% of the cost

## Publications

1. **P. Slade**, Z. Sunberg, and M. Kochenderfer. “Estimation and control using sampling-based Bayesian reinforcement learning”, arXiv preprint arXiv:1808.00888, Aug. 2018.
2. **P. Slade**, R. Troutman, M.J. Kochenderfer, S.H. Collins, S.L. Delp. “Rapid energy expenditure estimation for assisted and inclined loaded walking”, bioRxiv preprint 401836, Sept. 2018.

3. **P. Slade**, P. Culbertson, Z. Sunberg, and M. Kochenderfer. "Simultaneous active parameter estimation and control using sampling-based Bayesian reinforcement learning", in IEEE/RSJ International Conference on Intelligent Robots and Systems, Oct. 2017.
4. **P. Slade**, A. Gruebele, Z. Hammond, M. Raitor, A.M. Okamura, and E.W. Hawkes. "Design of a Soft Catheter for Low-Force and Constrained Surgery," in IEEE/RSJ International Conference on Intelligent Robots and Systems, Oct. 2017.
5. **P. Slade**, S. Powell, M. Howland. "Optimal control of a single leg hopper by Liouvillian system reduction," in arXiv preprint arXiv:1710.02133, 2017.
6. **P. Slade**, S. Erickson, J. Bernhardt, D. Holland, and C. Walsh, "Active Knee Exosuit to Assist Uphill Ascent and Stair Climbing," ASME Journal of Medical Devices, 2016.
7. A. Akhtar, ... , **P. Slade**, ... , T. Bretl, "A Low-Cost, Open-Source, Compliant Hand for Enabling Sensorimotor Control for People with Transradial Amputations", in IEEE Engineering in Medicine and Biology Society, Oct. 2016.
8. **P. Slade**, A. Akhtar, M. Nguyen, and T. Bretl, "Tact: Design and Performance of an Open-Source, Affordable, Myoelectric Prosthetic Hand," in IEEE International Conference on Robotics and Automation, Seattle, May 2015.
9. A. Akhtar, M. Nguyen, L. Wan, B. Boyce, **P. Slade**, and T. Bretl, "Passive mechanical skin stretch for multiple degree-of-freedom proprioception in a hand prosthesis," in EuroHaptics, Versailles, Jun. 2014.

## Presentations

- International Conference on Intelligent Robots and Systems: Two paper talks (Sept. 2017)
- TEDxUIUC Speaker: technical call to action presentation (April 2016)
- UIUC Undergraduate Research Symposium Plenary Speaker (April 2016)
- Illinois Project Lead the Way Conference: Highlight talk to 400 STEM educators (Nov. 2015)
- UIUC Mechanical Engineering Seminar (ME 390 course): Guest lecturer (Oct. 2015)
- International Conference on Robotics and Automation: Oral paper presentation (May 2015)
- Harvard SEAS REU Conference: Highlight talk and poster (Aug. 2015)
- UIUC Undergraduate Research Symposium: Highlight talk and poster presentation (Feb. 2015)
- UIUC Engineering Speakers Day: Highlight talk (Feb. 2015)
- UIUC Illinois Scholar Undergrad Research Symposium: Highlight talks (March 2014 & 2015)

## Honors and Awards

- NSF SBIR Phase I (2018)
- AI Grant Fellow (2017)
- Stanford Graduate Fellowship (2016-2021)
- NSF Graduate Research Fellowship Program Awardee (2016-2021)
- Forbes (2016): selected as a 30 under 30 young innovator in Healthcare
- Bronze Tablet (2016): top 3% of graduating students in Engineering College (UIUC)
- Goldwater Scholar (2015): Awarded to 260 undergrads in the U.S. for research excellence
- James Honors Scholar (2013-16): Award for academic excellence (UIUC)
- MechSE Outstanding Scholar (2013-16): Departmental merit award (UIUC)
- James Newton Matthews Scholarship (2013-16): Award for community service (UIUC)
- Dean's List (2013-2016): Top 20% of engineering students (UIUC)
- Illinois Scholar Undergrad Research (2014-16): Research excellence program (UIUC)

## **Outreach and Activities**

- Mentor for the AI4ALL computational biology team, teaching and leading a project where high school girls apply artificial intelligence techniques for cancer detection
- Mentor for the RISE program, enabling low-income high school students to perform research at Stanford
- Mentor for Global Entrepreneur Summit (Northwestern) (2016-2018)
- Engineering Council: Engineering Information Bureau (2013-2016): STEM outreach group that plans UIUC events to get younger students interested and engaged in engineering and science
- Led STEM presentations and interactive exhibits for Bretl Research Group at Beckman Open House, local middle school science nights, and invited talks (2013-2016)
- Dingoball founder, Climbing Team, Holy Spokes volunteer, Musician