NEEL DOSHI

Postdoctoral Associate

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EDUCATION

Harvard University — Cambridge, MA
Doctor of Philoshophy, Engineering Sciences — *May 2019*
Thesis: *Model-based design, control, and planning for legged microrobots*
Advisors: Robert J. Wood & Scott Kuindersma

Harvard University — Cambridge, MA
Master of Science, Engineering Sciences — *Nov 2015*

University of Pennsylvania — Philadelphia, PA
Master of Science, Robotics — *May 2013*

University of Pennsylvania — Philadelphia, PA
Bachelor of Science, *summa cum laude*, Mechanical Engineering — *May 2012*
Minors: Electrical Engineering, Mathematics

PROFESSIONAL EXPERIENCE

Massachusetts Institute of Technology — Cambridge, MA
Postdoctoral Researcher, The MCube Lab — *April 2019-Present*

- Combining mechanics and trajectory optimization to develop tools for planning, estimation, and control through contact for robotic manipulation.
- Designing robotic fingers that leverage switchable adhesion to simplify dexterous manipulation.

Harvard University — Cambridge, MA
Doctoral Student, Harvard Microrobotics Laboratory — *Sept 2013-March 2019*

- Used trajectory optimization and machine learning to plan and control the locomotion of millimeter-scale (mm-scale) legged robots, e.g., the Harvard Ambulatory Microrobot (HAMR).
- Developed techniques to optimized the design of mm-scale structures with applications to the design of robot-feet that enable novel locomotion modalities, including climbing and swimming.

University of Pennsylvania — Philadelphia, PA
Research Assistant, ModLab — *Mar 2012-July 2013*

- Developed an analytic simulator to resolve the hydrodynamics of a large (100+ node) elastically linked modular sea-bases for DARPA (Defense Advanced Research Projects Agency) research.

NASA Goddard Space Flight Center — Greenbelt, MD
Robotics Intern, NASA-GSFC — *Summer 2011*

- Designed, analyzed, and manufactured a protective thermal enclosure for the electronics of Grover 2, an autonomous rover designed to explore Greenland's ice sheets.

SELECTED PUBLICATIONS

Planning and control through contact

10. **N. Doshi***, O.T. Taylor* et al., *Manipulation of unknown objects via contact configuration regulation.* Submitted to the International Conference on Robotics and Automation (ICRA) 2022.

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*contributed equally

9. J. Gruenstein, T. Chen, **N. Doshi**, and P. Agrawal, *Residual Model Learning for Microrobot Control.* ICRA 2021.

8. **N. Doshi**, F.R. Hogan, and A. Rodriguez, *Hybrid differential dynamic programming for planar manipulation primitives.* ICRA 2020.

SELECTED PUBLICATIONS (CONT.)

7. Z. Manchester, **N. Doshi**, R. J. Wood, and S. Kuindersma, *Contact-Implicit trajectory optimization using variational integrators.* The International Journal of Robotics Research (IJRR) 2019.

6. **N. Doshi**, et al., *Contact-implicit optimization of locomotion trajectories for a quadrupedal microrobot.* Robotics: Science and Systems (RSS) 2018.

Design for manipulation and locomotion

5. R. Jiang et al. including **N. Doshi**, *Shape and Motion Optimization of Rigid Planar Manipulators for Contact Trajectory Satisfaction.* Submitted to ICRA 2022.

4. I. H. Taylor et al. including **N. Doshi**, *PnuGrip: An active two-phase gripper for dexterous manipulation.* International Conference on Intelligent Robots and Systems (IROS) 2020.

3. S. D. Rivaz et al. including **N. Doshi**, *Inverted and vertical climbing of a quadrupedal microrobot using electroadhesion.* Science Robotics 2018.

2. Y. Chen, **N. Doshi**, et al. *Controllable water surface to underwater transition through electrowetting in a hybrid terrestrial-aquatic microrobot.* Nature Communications 2018.

1. **N. Doshi** et al., *Model driven design for flexure-based microrobots.* IROS 2015.

AWARDS AND RECOGNITION

Fellowships

Intelligence Community Postdoctoral Research Fellowship[†]	*2019-2021*
National Defense Science and Engineering Graduate (NDSEG) Fellowship[†]	*2014-2017*
Honorable Mention, National Science Foundation (NSF) Graduate Fellowship	*2014*

Best Paper/Project Awards

RA-L Best Paper Award	*2020*
Finalist, Best Conference Paper Award (ICRA)	*2018*
Finalist, Best Conference Paper Award (IROS)	*2017*
Best Automation Paper (ICRA)	*2014*
William K. Gemmill Memorial Award for Senior Design Project	*2012*

Popular Press

Popular Mechanics, Science Daily, My Science (+75 more) for publication **3**	*2018*
Wired, TechTimes, Tech Xplore, (+15 more): for publication **2**	*2018*

INTELLECTUAL PROPERTY

N.C. Dafle, A. Rodriguez, **N. Doshi**, and I. Taylor, *PnuGrip: an active two-phase gripper for dexterous manipulations.* Provisional Application, 2020.

TECHNICAL SKILLS

- **Software Skills:** MATLAB, Python, C++, and Robot Operating System (ROS).
- **CAD and Fabrication Skills**: SolidWorks, OnShape, DraftSight, 3D printing, laser cutting, and laminate manufacturing.

References can be provided upon request.
For a full academic CV, see https://neeld.github.io/assets/pdfs/CV.pdf.

[†]full funding