

# Alexander L. Burka

4337 Pine St, Apt. 1F  
Philadelphia, PA 19104

(484) 278-3789  
aburka@seas.upenn.edu

- Education**
- University of Pennsylvania**, Philadelphia, PA *2012 - present*  
Ph.D. Candidate in Electrical & Systems Engineering  
IMPRS-IS Associated Scholar  
Research: Robotics/Haptics      Advisor: Katherine J. Kuchenbecker  
GPA: 3.64
- Swarthmore College**, Swarthmore, PA *2008 - 2012*  
B.S. in Engineering  
Concentration in Electrical and Computer Engineering  
Minors in Cognitive Science and Mathematics  
GPA: 3.93 in major, 3.81 overall
- Experience**
- Ph.D. Research**, University of Pennsylvania, Philadelphia, PA *2012 - present*
- Visuo-haptic surface classification
    - Designing, building and testing a multimodal sensor device to build a texture dataset
    - Applications to textural surface classification for autonomous robots
    - Collaboration with the University of California, Berkeley
  - Robotic technology for airplane engine repair
    - Designed and implemented a sensor package to characterize bore-blending equipment
    - Collaboration with Rolls-Royce On Wing Care
  - Developed a collision warning system for SEPTA buses
    - Designed and built a parametric speaker
    - Implemented a prototype pedestrian detector for automatic warnings
  - Member of Team THOR for the 2013 DARPA Robotics Challenge
    - Managed software and networking during dress rehearsal
    - Constructed test equipment to approximate DRC tasks
  - Computer vision and structure learning
    - Developed mathematical representation for complex articulated objects
    - Implemented a visual kinematic learning system for autonomous robots
- Robotics Research Intern**, Swarthmore College, Swarthmore, PA *2011*
- Developed visual navigation algorithm for a general purpose mobile robot (Turtlebot)
  - Worked with the ROS robot operating system and the OpenCV computer vision library
- Peer Tutoring “Wizard,”** Swarthmore College, Swarthmore, PA *2009 - 2012*
- Led study sessions and assisted with laboratory instruction in engineering courses
  - Courses: Mobile Robotics, Linear Physical System Design, and Electrical Circuit Analysis
- Laser Laboratory Intern**, Swarthmore College, Swarthmore, PA *2009*
- Developed automated waveguide testing apparatus using LabVIEW
  - Simulated coupled waveguide arrays using C
  - Sponsored through an HHMI research fellowship
- Sysadmin**, Swarthmore College Computing Society, Swarthmore, PA *2008 - 2012*
- Spearheaded equipment reservation web application project
  - Developed RFID card entry system
  - Administered Linux servers and Mac OS X clients
- Summer Intern**, MIT Lincoln Laboratory, Lexington, MA *2008*
- Developed web application for publication tracking
  - Planned and implemented a robotics workshop for high school students

<b>Leadership Activities</b>	<b>Village Education Project</b> <span style="float: right;">2009 - 2012</span> <ul style="list-style-type: none"> <li>• Student-run nonprofit working against educational inequality in rural Ecuador</li> <li>• Developed and taught computer curriculum in Ecuador (summer 2009)</li> <li>• Assisted with supervising volunteers in Ecuador (summer 2011)</li> <li>• Directed fundraising activities <ul style="list-style-type: none"> <li>– Designed and implemented silent auction web application</li> <li>– Secured loaner laptops through the OLPC Contributors Program</li> </ul> </li> </ul>
	<b>IEEE Swarthmore Student Chapter</b> <span style="float: right;">2010 - 2011</span> <ul style="list-style-type: none"> <li>• Chapter president, 2010-2011</li> <li>• Promoted electrical engineering-related activities within the department</li> <li>• Developed firmware for student Micromouse robotics team</li> </ul>
<b>Awards and Honors</b>	<b>NSF Graduate Research Fellowship</b> <span style="float: right;">awarded 2013</span> <b>Tau Beta Pi</b> , The Engineering Honor Society <span style="float: right;">initiated 2011</span> <b>Sigma Xi</b> , The Scientific Research Society <span style="float: right;">inducted 2009</span>
<b>Skills</b>	<i>Languages:</i> English (native), Spanish (conversational) <i>Engineering Skills:</i> Robotics, Circuit design, Embedded processor development <i>Programming:</i> Rust, C/C++, Python, Java, HTML/JS, Clojure, L <sup>A</sup> T <sub>E</sub> X <i>Computer Software:</i> Linux/OS X/Windows, Android, MATLAB, PCB Artist
<b>Publications</b>	<p>Alex Burka and Katherine J. Kuchenbecker (2017). <i>Handling Scan-time Parameters in Haptic Surface Classification</i>. IEEE World Haptics Conference (WHC), Fürstfeldbruck, Germany. (Candidate for Best Poster Paper.)</p> <p>Alex Burka, Abhinav Rajvanshi, Sarah Allen and Katherine J. Kuchenbecker (2017). <i>Proton 2: Increasing the Sensitivity and Portability of a Visuo-haptic Surface Interaction Recorder</i>. International Conference on Robotics and Automation (ICRA); Singapore.</p> <p>Alex Burka and Katherine J. Kuchenbecker (2017). <i>How Much Haptic Surface Data Is Enough?</i> Association for the Advancement of Artificial Intelligence (AAAI) Spring Symposium; San Francisco, CA.</p> <p>Alex Burka, Siyao Hu, Stuart Helgeson, Shweta Krishnan, Yang Gao, Lisa Anne Hendricks, Trevor Darrell and Katherine J. Kuchenbecker (2016). <i>Proton: A visuo-haptic data acquisition system for robotic learning of surface properties</i>. Multisensor Fusion and Integration (MFI); Baden-Baden, Germany.</p> <p>Alex Burka, Siyao Hu, Stuart Helgeson, Shweta Krishnan, Yang Gao, Lisa Anne Hendricks, Trevor Darrell and Katherine J. Kuchenbecker (2016). <i>Design and Implementation of a Visuo-Haptic Data Acquisition System for Robotic Learning of Surface Properties</i>. Haptics Symposium; Philadelphia, PA.</p> <p>Alex Burka, Siyao Hu, Shweta Krishnan, Lisa Anne Hendricks, Yang Gao, Trevor Darrell and Katherine J. Kuchenbecker (2015). <i>Toward a large-scale visuo-haptic dataset for robotic learning</i>. Computer Vision and Pattern Recognition (CVPR); Boston, MA.</p> <p>Alex Burka, Alaric Qin and Daniel D. Lee (2014). <i>An Application of Parametric Speaker Technology to Bus-Pedestrian Collision Warning</i>. Intelligent Transportation Systems Conference (ITSC); Qingdao, China.</p> <p>Alex Burka and Matt Zucker (2011). <i>Vision-Based Localization for Mobile Robots</i>. Poster session presentation at Sigma Xi; Swarthmore, PA.</p> <p>Alex Burka, Lucas Janes, Bo Sun, and Lynne Molter (2009). <i>Non-linear transmittance properties of dielectric slab waveguides</i>. Poster session presentation at Sigma Xi; Swarthmore, PA.</p> <p>Alex Burka, Lucas Janes, Bo Sun, and Lynne Molter (2009). <i>Numerical simulation of loosely coupled circular waveguide arrays</i>. Poster session presentation at Sigma Xi; Swarthmore, PA.</p>
<b>References</b>	<i>References available upon request.</i>