# LENA BARTELL

linkedin.com/in/lenabartell

Multi-disciplinary scientist with a breadth of collaborative and self-directed research experience, including practical knowledge in data analysis & visualization, science communication, optical imaging, and bio-mechanics. Keenly interested in integrating these skills to provide actionable insight for scientific and data-driven problems.

## EDUCATION

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|---|---|
| 2011 – 2018 | **Cornell University** – Ph.D. in Applied Physics, Biomedical Engineering minor, 3.90 / 4.00 (expected) |
| 2007 – 2011 | **Penn State University** – B.S. with Honors in Physics, Biomedical Engineering & Mathematics minors, 3.97 / 4.00 |

## SKILLS

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|---|---|
| TECHNIQUES | Data analysis • Image analysis • Computer vision • Linear regression modeling • Logistic regression modeling • Data visualization • Science communication • Microscopy • Mechanical testing • Sterile dissection & culture |
| LANGUAGES, ETC. | MATLAB (computer vision, statistical models, data visualization) • Python (NumPy, Matplotlib, Pandas, SciPy) • Inkscape (vector graphics) • Autodesk Inventor (3D CAD) • MS Office • HTML & CSS • LaTeX • GitHub • Tableau |

## RESEARCH PROJECTS

**2012 – PRESENT**

**Custom tools and techniques to study orthopedic mechanobiology**
*Cornell University, Ithaca, NY*
· Designed and built custom mechanical testing stage that interfaces with 1,000 FPS imaging
· Developed broadly-applicable image segmentation algorithm using MATLAB
· Analyzed large microscopy data sets over space and time (~20 x 5 GB data sets)
· Fit mixed effects linear regression statistical models to relate tissue mechanics with cellular dysfunction
· Cultivated collaborations in biomedical engr. & veterinary medicine

**2016 – 2017**

**Fracture mechanics of articular cartilage**
*Cornell University, Ithaca, NY*
· Mentored students in experiment design, data collection, data analysis, and science communication
· Applied MATLAB and Python algorithms to track and analyze samples over space and time

**2015 – 2017**

**4D flow behavior of glass coatings**
*Corning Inc., Corning, NY & Cornell University, Ithaca, NY*
· Managed collaboration with Corning Inc., including quarterly presentations and a final report
· Compiled and analyzed large, multi-dimensional confocal microscopy data sets using MATLAB and Python
· Developed N-dimensional Barnes objective analysis (smoothing interpolation) in MATLAB

**2009 – 2011**

**X-ray dosimeters for diagnostic breast cancer imaging**
*University of Pennsylvania, Philadelphia, PA*
· Designed, constructed, and studied the response of a custom x-ray dosimeter
· Modeled measurement biases of existing dosimeters using MATLAB

**2008 – 2009**

**Eliminating noise from IceCube neutrino observatory data**
*Penn State University, State College, PA*
· Developed level-zero filter in C++ to eliminate noise from raw neutrino detector data

## DATA ANALYSIS & CODING PROJECTS

**2017**

**GUI for automated segmentation and classification of microscopy images**
· Developed custom image segmentation algorithm based on the watershed transform
· Implemented both segmentation and classification in a portable, user-friendly GUI
· Created training tutorial and distributed GUI to collaborators using GitHub
· GUI has been used for data analysis in at least three projects that will submitted for publication soon

**2016**

**WXPN radio "A to Z" marathon playlist analysis**
· Developed spider in Python to scrape playlist metadata from website and link to additional open source data
· Cleaned data and collected summary stats using Python (NumPy, Pandas)
· Created interactive public visualization using Tableau and shared via Twitter (click for news coverage)

## DATA ANALYSIS & CODING PROJECTS (CONTD.)

2016    **N-dimensional Barnes objective analysis**
· Extended existing 2D Barnes smoothing interpolation into arbitrary N dimensions
· Programed algorithm in MATLAB and utilized it in multiple other research projects

2015    **Personal website (lenabartell.com)**
· Created website using HTML and CSS
· Managed website domain, hosting

## RELEVANT COURSEWORK

2017    *Andrew Ng's Machine Learning Coursera Course* – Free introduction to machine learning

2016    *Google's Python Class* – Free introduction to programming with Python

2015    *Computer Vision* – Image data acquisition and analysis with emphasis on techniques for robot vision

2014    *Finding Your Scientific Voice Workshop* – Intensive presentation and public speaking workshop

2014    *Business as a Second Language* – Introduction to business finances, marketing, etc. for engineering PhDs

2013    *Commercializing University Technology* – Course on bringing science to market, for MBAs and engineers

## LEADERSHIP EXPERIENCE & OUTREACH

2016 – 2017    *Homemade microscope outreach*– Design & produce module teaching high school students about imaging

2015 – 2016    *Student Employee* – Cornell McGovern Center for Venture Development in the Life Sciences

2015    *Leadership Assessment for Managers Course* – Leadership exercises and self-assessment

2014 – 2015    *Advisory Board Member* – NIH Broadening Experiences for Scientific Training program at Cornell

2009 – 2011    *President* – Penn State University Society of Physics Students

## SELECT AWARDS & FELLOWSHIPS

2016 - PRESENT    NIH Individual F31 Predoctoral Fellowship Grant

2012 - 2015    NSF Graduate Research Fellowship

2011 - 2012    Cornell Presidential Life Science Fellowship (1 year graduate training & stipend)

2011    Penn State Schreyer Honors College Evans Award for Research Achievement

2009    Goldwater Scholarship

2009    American Association of Physicists in Medicine Undergraduate Fellowship

2010 – 2011    Penn State Department of Physics Scholarship

2007 - 2011    Penn State Braddock Scholarship (4 years full tuition, room & board)

## RESEARCH PRESENTATIONS

2015, 2017    Podium presentation, Orthopaedic Research Society

2014, 2016    Poster presentation, Orthopaedic Research Society

2014    Podium presentation, Society of Rheology

2013    Poster presentation, Gordon Research Conference: Soft Condensed Matter Physics

2011    Podium presentation, International Association of Physics Students

## PATENT

2017    "Buckling technique to determine tissue engineered construct readiness," U.S. Provisional Application, pending.

## SELECT PUBLICATIONS

2017    L.R. Bartell, L.J. Bonassar, I. Cohen. ArXiv Computer Vision and Pattern Recognition arXiv:1706.00815

2016    C.R. Henak, L.R. Bartell, L.J. Bonassar, I. Cohen.  Journal of Biomedical Engineering 139, 031004

2015    L.R. Bartell, L.A. Fortier, L.J. Bonassar, I. Cohen. Journal of Biomechanics 48, 3440-3446

*6 other publications, including 4 first-author and 2 co-author (1 submitted, 2 in preparation)*