

LENA BARTELL

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SKILLS

TECHNIQUES	Computer vision (filtering, morphological image processing, registration, segmentation) • Microscopy • Machine learning (exploratory analytics, regularization, normalization, regression, classification, cross-validation) • Regression (linear, logistic, mixed-effects, random forest) • Data visualization (figure design, dashboards)
LANGUAGES, ETC.	Python (Pandas, NumPy, SciPy, scikit-learn, StatsModels, Matplotlib, Scrapy) • MATLAB • Flask/Dash • HTML/CSS • SQL (Postgres) • Inkscape (vector graphics) • Autodesk Inventor (3D CAD) • LaTeX • Tableau • Git

PROJECTS & EXPERIENCE

2018 – PRESENT	Let's Get Clinical: Predicting clinical trial drop-out rates (<i>Insight Data Science project</i>) <i>Fellow, Insight Data Science, Boston, MA</i> <ul style="list-style-type: none">• Extracted and cleaned data (continuous, categorical, text) from 40-table relational database using Python (pandas) and PostgreSQL• Modeled trial dropout rates using linear regression and random forests in Python (StatsModels, scikit-learn)• Deployed online app via Dash/Heroku to predict the number of patients that will drop out of a clinical trial (letsgetclinical.herokuapp.com)
2012 – PRESENT	Injury-induced cellular dysfunction in articular cartilage (<i>PhD thesis</i>) <i>PhD Candidate, Cornell University, Ithaca, NY</i> <ul style="list-style-type: none">• Built custom mechanical testing stage that interfaced with optical microscopy to measure soft tissue properties• Analyzed multi-dimensional imaging data sets (~20×1 GB) to segment, track, and classify cell behavior over space and time using MATLAB and Python• Quantified relationship between cell dysfunction and treatment using mixed-effects regression (linear, logistic)• Presented research quarterly in small-group meeting and at 7 scientific conferences• Mentored 5 researchers and cultivated collaborations with veterinary surgeons and biomedical engineers
2017	GUI for automated segmentation and classification of microscopy images (<i>PhD thesis</i>) <i>PhD Candidate, Cornell University, Ithaca, NY</i> <ul style="list-style-type: none">• Developed custom image segmentation and classification algorithm based on the watershed transform• Deployed image algorithm as a portable GUI using MATLAB, enabling non-technical collaborators to utilize computer vision techniques (GUI and tutorial: github.com/itaicohengroup/watershed_cells_gui)• Published training tutorial and distributed GUI to collaborators using GitHub
2015 – 2017	4D flow behavior of protective glass coatings (<i>PhD thesis</i>) <i>PhD Candidate, Cornell University, Ithaca, NY, in collaboration with Corning Inc., Corning, NY</i> <ul style="list-style-type: none">• Implemented N-dimensional Barnes smoothing interpolation in MATLAB, extending previously 2D algorithm• Compiled and analyzed large, multi-dimensional confocal microscopy data sets using MATLAB and Python• Coordinated collaboration with Corning Inc., including quarterly presentations and final reports
2016	WXPN radio "A to Z" marathon playlist analysis (<i>Personal project</i>) <ul style="list-style-type: none">• Scraped playlist metadata from web and linked to additional open database APIs using Python (Scrapy)• Cleaned data and calculated summary statistics using Python (pandas, NumPy)• Created and shared interactive visualization using Tableau & Twitter (viz: public.tableau.com/views/XPNA_AtoZ/XPNA-Z, news coverage: thekey.xpn.org/2016/12/16/lena-bartell/)
2009 – 2011	X-ray dosimeters for diagnostic breast cancer imaging (<i>Undergraduate thesis</i>) <i>Undergraduate Researcher, University of Pennsylvania, Philadelphia, PA</i> <ul style="list-style-type: none">• Designed, constructed, and studied the response of a custom X-ray dosimeter• Simulated measurement biases of existing dosimeters from first-principles using MATLAB

EDUCATION

2011 – 2018	Cornell University (Ithaca, NY) – Ph.D. in Applied Physics, Minor in Biomedical Engineering
2007 – 2011	Penn State University (State College, PA) – B.S. with Honors in Physics, Minors in Biomedical Engineering & Math

PUBLICATIONS

- 2017 J.M. Middendorf, et al. *In vitro culture increases mechanical stability of human tissue engineered cartilage constructs by prevention of microscale scaffold buckling*. Journal of Biomechanics 64, 77-84
- 2017 L.R. Bartell, et al. *Three-dimensional microscale flow of polymer coatings on glass during indentation*. MRS Communications 7, 896-903
- 2017 L.R. Bartell, L.J. Bonassar, I. Cohen. *A watershed-based algorithm to segment and classify cells in fluorescence microscopy images*. ArXiv Computer Vision and Pattern Recognition arXiv:1706.00815
- 2016 C.R. Henak, L.R. Bartell, L.J. Bonassar, I. Cohen. *Multiscale Strain as a Predictor of Impact-Induced Fissuring in Articular Cartilage*. Journal of Biomedical Engineering 139, 031004
- 2015 L.R. Bartell, L.A. Fortier, L.J. Bonassar, I. Cohen. *Measuring microscale strain fields in articular cartilage during rapid impact reveals thresholds for chondrocyte death and a protective role for the superficial layer*. Journal of Biomechanics 48, 3440-3446
- 2010 L.R. Bartell, A.K. Carton, A.D.A. Maidment. *Angular dependence of mammographic dosimeters in digital breast tomosynthesis*. Proc. of Medical Imaging 7622, 76225L
- 3 other publications: 2 submitted, 1 in preparation

PATENT

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

AWARDS & FELLOWSHIPS

- 2016 - 2018 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
- 2007 - 2011 Penn State Braddock Scholarship (4 years full tuition, room & board)

SELECT 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

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