# Curriculum Vitae


## Jackson A. Killian

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## EDUCATION

**Ph.D. Computer Science** (in progress) (Aug 2019 – present)
*Harvard University, Boston, MA*

**Ph.D. Computer Science** (transferred) (Aug 2018 – Aug 2019)
*University of Southern California, Los Angeles, CA*

**B.S. Physics, Computer & Information Science** (Aug 2013 – May 2018)
*Ohio State University, Columbus, OH* Arts and Sciences Honors College
Overall GPA (4.00 scale): 3.994 Summa Cum Laude / Honors Research Distinction

## RESEARCH EXPERIENCE

**Ph.D. Research Fellow – Computer Science** (Aug 2018 – present)
*Harvard University, Boston, MA*
Advisors: Dr. Milind Tambe (previously Dr. Bistra Dilkina, USC, 2018-19)

- Derive new theory for Restless Bandits to facilitate sequential health intervention planning in low-data regimes
- Build deep learning models to predict patient adherence to tuberculosis (TB) medications in India
- Develop large-scale agent-based simulations to model the dynamics of COVID-19 in different populations
- Collaborate with international teams across government, NGOs and academia to address public health challenges

**Ph.D. Research Intern – Computer Science** (Jun 2019 – Aug 2019)
*Microsoft Research India*
Advisor: Amit Sharma

- Design counterfactual explanation method for machine learning models meant for healthcare workers in India
- Lead workshop with researchers and TB experts in India to identify opportunities for AI to support patient care
- Build relationships with non-profit organizations and state health officials in Bangalore and Mumbai

**Undergraduate Thesis – Computer and Information Science** (May 2017 – Apr 2018)
*Ohio State University, Columbus, OH*
Advisors: Dr. Kevin Passino and Dr. Arnab Nandi

- Design study to gather smartphone sensor data and Transdermal Alcohol Content (TAC) from 19 students
- Create mobile application and server to continuously collect and send sensor data over 12 hours
- Process noisy accelerometer and TAC signals and design filters to ease downstream analysis using MATLAB
- Extract features from signals and design intelligent systems to make classifications using MATLAB and Python

**Undergraduate Research Fellowship – Biophysics** (May 2016 – May 2017)
*Ohio State University, Columbus, OH*
Advisors: Dr. Ralf Bundschuh and Dr. Pearlly Yan

- Design computational workflow to make low-quality cancer samples useable in modern sequencing experiments
- Utilize Ohio Supercomputing Center and bioinformatics software to quantify degradation in sequencing data
- Adapt software based on discovered effects to improve sequencing data quality enabling downstream research

**Undergraduate Research Assistant – Biophysics** (Jan 2015 – Apr 2018)
*Ohio State University, Columbus, OH*
Advisors: Dr. Ralf Bundschuh and Dr. Pearlly Yan

- Collaborate with biologists to identify novel cancer-related characteristics in human genes and epigenetics
- Develop software with Python and R to design computational workflows for high-throughput sequencing data
- Design web applications for bioinformatics tools using Python, PHP, JavaScript, HTML and CSS
- Build workflows to run on nodes of the Ohio Supercomputer Center to analyze terabyte-order datasets

## PUBLICATIONS (with proceedings)

***** - equal contribution

**Killian JA**, Perrault A, Tambe M. "Beyond "To Act or Not to Act": Fast Lagrangian Approaches to General Multi-Action Restless Bandits." *20th International Conference on Autonomous Agents and Multiagent Systems.* 2021.

Mate A*, **Killian JA***, Xu H, Perrault A, Tambe M. "Collapsing Bandits and Their Application to Public Health Interventions" *Neural Information Processing Systems (NeurIPS).* 2020. https://papers.nips.cc/paper/2020/hash/b460cf6b09878b00a3e1ad4c72344ccd-Abstract.html

Wilder B, Charpignon M, **Killian JA**, Ou HC, Mate A, Jabbari S, et al. "Modeling between-population variation in COVID-19 dynamics in Hubei, Lombardy, and New York City" *Proceedings of the National Academy of Sciences.* 2020. https://doi.org/10.1073/pnas.2010651117

**Killian JA**, Wilder B, Sharma A, Choudhary V, Dilkina B, Tambe M. "Learning to Prescribe Interventions for Tuberculosis Patients using Digital Adherence Data" *Proceedings of the 25th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD)*. ACM, 2019. https://doi.org/10.1145/3292500.3330777

**Killian JA,** Passino K, Nandi A, Madden D, Clapp J. "Learning to Detect Heavy Drinking Episodes Using Smartphone Accelerometer Data" *Proceedings of the 4th International Workshop on Knowledge Discovery in Healthcare Data.* 2019. http://ceur-ws.org/Vol-2429/paper6.pdf

**Killian JA**, Topiwala T, Pelletier A, Frankhouser D, Yan P, Bundschuh R. "FuSpot: A Web-based Tool for Visual Evaluation of Fusion Candidates" *BMC Genomics*. 2018. 19:139. https://doi.org/10.1186/s12864-018-4486-3

He H, Li W, Yan P, Bundschuh R, **Killian J**, Labanowska J, et al. "Identification of a recurrent LMO7-BRAF fusion in papillary thyroid carcinoma" *Thyroid*. 2018. https://doi.org/10.1089/thy.2017.0258

## PREPRINTS

Mate A, **Killian JA**, Wilder B, et al. "Evaluating COVID-19 Lockdown Policies For India: A Preliminary Modeling Assessment for Individual States." Available at SSRN 3575207. 2020. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3575207

## WORKSHOP PAPERS/DOCTORAL CONSORTIA (without proceedings)

**Killian JA**, Perrault A, Tambe M. "Fast Intervention Scheduling via Lagrangian Solutions to Multi-Action Restless Bandits." AAAI-21 Workshop on AI for Behavior Change. 2021.

**Killian JA**, Perrault A, Tambe M. "Fast Intervention Scheduling via Lagrangian Solutions to Multi-Action Restless Bandits." AAAI-21 Workshop on Designing AI for Telehealth. 2021.

Prins A, Mate M, **Killian JA**, Abebe R, Tambe M. "Incorporating Healthcare Motivated Constraints in Restless Multi-Armed Bandit Based Resource Allocation" NeurIPS-20 Workshop on Machine Learning for Health. 2020.

- Awarded: **Best on Theme**

Prins A, Mate M, **Killian JA**, Abebe R, Tambe M. "Incorporating Healthcare Motivated Constraints in Restless Multi-Armed Bandit Based Resource Allocation" NeurIPS-20 Workshop on Machine Learning in Public Health. 2020.

- Awarded: **Best Lightning Paper**

## WORKSHOP PAPERS/DOCTORAL CONSORTIA (without proceedings, continued)

Sharma A, **Killian JA**, Perrault A. "Optimization of the Low-Carbon Energy Transition Under Static and Adaptive Carbon Taxes via Markov Decision Processes" Harvard CRCS Workshop on AI for Social Good. 2020.

**Killian JA**, Charpignon M, Wilder B, Perrault A, Tambe M, Majumder MS. "Evaluating COVID-19 Lockdown and Reopening Scenarios for Georgia, Florida, and Mississippi." KDD-20 Workshop on Humanitarian Mapping. 2020.

Mate A*, **Killian JA***, Xu H, Perrault A, Tambe M. "Collapsing Bandits and Their Application to Public Health Interventions." Doctoral Consortium on Computational Sustainability. 2020

**Killian JA**, Wilder B, Sharma A, Choudhary V, Dilkina B, Tambe M. "Learning to Prescribe Interventions for Tuberculosis Patients using Digital Adherence Data." AAMAS-19 Joint Workshop on Autonomous Agents for Social Good. 2019.

## ACCEPTED TALKS

- "Personalized Adherence Management in TB: Using AI to Schedule Targeted Interventions"
  - **51st Union World Conference on Lung Health** (Oct 2020)
- "Collapsing Bandits and Their Application to Public Health Interventions"
  - **Doctoral Consortium on Computational Sustainability** (Oct 2020)
- "Evaluating COVID-19 Lockdown and Business-Sector-Specific Reopening Policies for Three US States"
  - **KDD Workshop on Humanitarian Mapping 2020** (Aug 2020)
- "Learning to Prescribe Interventions for Tuberculosis Patients using Digital Adherence Data"
  - **KDD 2019** (Aug 2019)
- "Learning to Detect Heavy Drinking Episodes Using Smartphone Accelerometer Data"
  - **IJCAI KDH Workshop 2019** (Aug 2019)
- "Learning to Prescribe Interventions for Tuberculosis Patients using Digital Adherence Data"
  - **AAMAS AASG Workshop 2019** (May 2019)

## POSTER PRESENTATIONS

- "Collapsing Bandits and Their Application to Public Health Interventions"
  - **NeurIPS 2020** (Dec 2020)
- "Collapsing Bandits and Their Application to Public Health Interventions"
  - **Doctoral Consortium on Computational Sustainability** (Oct 2020)
- "Learning to Prescribe Interventions for Tuberculosis Patients using Digital Adherence Data"
  - **KDD 2019** (Aug 2019)
- "Smartphone-Based Intelligent System: Using AI to Track Sobriety using Smartphone Motion Sensors"
  - **Denman Undergraduate Research Forum** (Apr 2018)
  - **Awarded: 1st Place**
- "FuSpot: A Web-based Tool for Visual Evaluation of Fusion Candidates"
  - **Denman Undergraduate Research Forum** (Mar 2017)
- "FuSpot: A Tool for Fusion Detector Coverage Visualization of Chimeric RNA-seq Data"
  - **Rustbelt RNA Meeting** (Oct 2016)

## INVITED TALKS

- "Predictive Models of Medication Adherence for TB patients in India"
  - **AI vs. TB Workshop**, Mumbai, India (Jul 2019, Jan 2020)
  - **CompuSustNet,** Online (May 2019)
  - **BOTS Robotics Education Program**, LA, CA (Apr 2019)
  - **Goldman Sachs India**, Mumbai, India (Mar 2019)
  - **Wadhwani AI**, Mumbai, India (Mar 2019)
- "FuSpot: A Web-based Tool for Visual Evaluation of Fusion Candidates"
  - **Pelotonia Research Symposium**, Columbus, OH (Oct 2017)
- "OHI/O: Ohio State's Hackathon Program"
  - **CIO Tomorrow**, Columbus, OH (Apr 2017)

## HONORS AND AWARDS

- **National Science Foundation Graduate Research Fellowship**, USC, Harvard (Apr 2019 – Apr 2022)
- **1st Place in Math, Computation, and Analytics**, Denman Research Forum, OSU (Apr 2018)
- **Arts and Sciences Undergraduate Research Scholarship**, Ohio State University (Nov 2017)
- **Physics Senior Alumni Award,** Top graduating senior, OSU Physics (May 2017)
- **Pelotonia Undergraduate Research Fellowship,** Columbus, OH (May 2016 – May 2017)
- **Member of Phi Beta Kappa,** National Honor Society (Apr 2016)
- **Member of Phi Kappa Phi,** National Honor Society (Oct 2015)
- **Member of Sigma Pi Sigma,** Physics Honor Society (Jan 2015)
- **Dean's List**, all semesters, Ohio State University Arts and Sciences Honors (Aug 2013 – Dec 2018)

## PROFESSIONAL EXPERIENCE

**Data Science Intern** (May 2018 – Jul 2018)
*Spatial.ai, Cincinnati, OH*
Managers: Lyden Foust, Will Kiessling

- Collect, clean and segment geo-tagged social media posts from everywhere in the United States
- Design natural language processing pipelines using Python to assess "social scores" for cities using social media
- Create predictive models based on "social scores" and demographic data to estimate success of retail store fronts

**Application Developer Intern** (May 2017 – Aug 2017)
*PNC, Philadelphia, PA*
Manager: James Snyder

- Work on software team to develop two ASP.NET web applications to support business operations
- Maintain Python/Django web application, retrofit with SSL certification to comply with security standards
- Design SQL Server Databases and Reports to support web applications

**Independent Database Designer** (Jun 2015 – present)
*Delaware City Bus Company, Sewell, NJ*
Clients: Greg and Isabel Fath

- Design MS Access database for private bus company with 150 bus routes, 80 buses, and 600 employees/students
- Implement functionality to generate schedules for drivers and aides and auto-create all company and state reports
- Construct custom back-end using SQL and VBA to provide a tailored, seamless UI/UX

## LEADERSHIP AND TEACHING-RELATED EXPERIENCE

- **Organizer**, AI for Society Rising Stars Workshop (March 2020)
  - Solicit and arrange reviews for 170 submissions
  - Organize 2 days of talks, posters, networking, mentoring for 60 attendees
  - Invite, coordinate 5 keynote talks and expert panels

## LEADERSHIP AND TEACHING-RELATED EXPERIENCE (continued)

- **Volunteer**, BOTS robotics education program for elementary students (Jan 2019 – May 2019)
  - Teach groups of 5-6 students basics of block programming
  - Lead professional development programming sessions for teachers
- **Teaching Assistant**, CSCI 102 - Fundamentals of Computation, *USC* (Aug 2018 – Dec 2018)
  - Deliver labs and course material reviews to section of 15 students
  - Create, manage, and grade 12 programming assignments for 200+ students
  - Manage team of 15 graders for 12 assignments, 2 exams, 200+ students
- **Creator, Organizer of ShowOHI/O,** a science-fair-style tech showcase (Apr 2017, Apr 2018)
  - 20 student projects, 60+ professional attendees, 100+ student attendees
  - Led team of 4 to secure venue, funding, projects, attendees, marketing
- **Organizer of DataFest** at Ohio State, a nation-wide data analytics competition (Apr 2017)
  - Organized sponsorship, marketing, team formation; mentored 150+ students
- **Web-team lead, Organizer of HackOHI/O**, Ohio State's hackathon program (Nov 2016, Oct 2017)
  - 750+ students, 200+ professional judges + mentors, 100+ industry partners
  - Organized sponsorship, marketing, team formation, branding; mentor at event
  - Led team of 6 developers to build web site, track site analytics
- **Project lead for data analysis contract** with Columbus Collaboratory (Apr 2016)
  - Led team of 4 to send survey nation-wide, perform text analysis on results

## MEDIA

- **Article:** Aria Bendix. "**Four Days of Work, Followed by 10 Days of Lockdown Could Help Prevent Another Wave of Infections.**" *Business Insider France*, May 25, 2020.
  - https://www.weizmann-usa.org/news-media/in-the-news/four-days-of-work-followed-by-10-days-of-lockdown-could-help-prevent-another-wave-of-infections/
- **Article:** Leah Burrows. "**What is the Right Strategy to Limit the Spread of COVID-19**?" *Medical Xpress*, May 4, 2020.
  - https://medicalxpress.com/news/2020-05-strategy-limit-covid-.html
- **Video Interview:** "**Models for the Spread of COVID-19**." *Live interview on ABC-7 WJLA*, April 30, 2020.
  - https://youtu.be/PzDeb6MDVDg
- **Article:** Amanda Mull. "**Georgia's Experiment in Human Sacrifice.**" *The Atlantic*, April 29, 2020.
  - https://www.theatlantic.com/health/archive/2020/04/why-georgia-reopening-coronavirus-pandemic/610882/
- **Article:** William Bredderman and Olivia Messer. "**New Model Shows How Deadly Lifting Georgia's Lockdown May Be.**" *Daily Beast*, April 28, 2020.
  - https://www.thedailybeast.com/ending-coronavirus-lockdowns-in-mississippi-georgia-and-florida-could-doom-thousands
- **Article:** Subhra Priyadarshini. "**Model Finds 'Middle Ground' for India's Lockdown Exit**." *Nature India*, April 27, 2020.
  - https://www.natureasia.com/en/nindia/article/10.1038/nindia.2020.73
- **Article:** Pelotonia. "**Pelotonia Investment Report (2017).**" *The James Ohio State University Comprehensive Cancer Center*, May 2017.
  - https://killian-34.github.io/pdf/2017%20Pelotonia%20Investment%20Report.PDF

**SKILLS**

- **Programming Languages (proficient)**: Python, Java, C#
- **Data Science/ML tools**: Sklearn, Numpy, Pandas, Keras, Pytorch, Tensorflow
- **Web-design Experience**: ASP.NET, Python/Django, PHP, JavaScript, HTML, CSS
- **Database-design Experience:** SQL, SQLite, Visual Basic, Microsoft Access
- **Research Programming Experience:** Python, R, Linux Environments, MATLAB, Android, iOS, Java