# K. DORUK KARINCA

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## EDUCATION

**University of California, Los Angeles (UCLA)**
*B.S. in Computer Science and Engineering* *3.50/4.00 GPA,* Expected Jun 2019

**Relevant Courses**: Statistical Machine Learning, Search Algorithms, Networks, Algorithms & Complexity, Programming Languages, OS, Computer Architecture, Statistics, Discrete Math

**Honors:** Dean's Honors

## RESEARCH EXPERIENCE

**UCLA, Computer Science, StarAI Lab** Los Angeles, CA
*Undergraduate Researcher and Developer* April 2019 – Present

- Extending the **Scala** implementation of the Probabilistic Sentential Decision Diagram Framework, which represents joint probability distributions over binary variables as circuits.

**UCLA, Electrical and Computer Engineering, Ozcan Research Group** Los Angeles, CA
**Howard Hughes Medical Institute (HHMI),** *Undergraduate Researcher and Developer* Dec 2015 – March 2019

- Sickle cell detection using a smartphone
  - Developed **MATLAB**-based **machine learning** image-analysis software (RUSBoost ML algorithm), detecting sickle cell anemia from portable microscope images, raising detection accuracy from 75% to 90%.
  - Built software to reduce sickle cell disease screening costs in Sub-Saharan African countries that have >150,000 deaths/year.
  - Received *Best Project Award at HHMI Ozcan Research Group* showcase.
- Water turbidity detection using a smartphone
  - Helped to develop a **Python** script for data postprocessing to detect ocean water turbidity.
  - Developed Windows Phone app with job control that allows a user to take photos of images, sends them to a MATLAB server and displays the turbidity detected from the image.
- Coliform detection using an xy-translational stage
  - Built low-cost **Raspberry Pi** system with two stepper motors that move an attached platform on an xy plane.
  - Wrote Python script that "scans" the entire platform and takes photos at predetermined intervals to expedite the analysis of a large batch of test tubes and to eliminate the need of biology experiment supervision.
- Portable phosphorus detector using a smartphone
  - Wrote MATLAB script that compares treated blood samples for phosphorus presence by measuring their average brightness from a photo and gives information on phosphorus content based on a calibration curve.
  - Developed Windows Phone app to upload photos for server-side analysis of results on MATLAB.

## PUBLICATIONS AND PRESENTATIONS

- Peer-reviewed articles
  - Snow, Jonathan W., Hatice Ceylan Koydemir, Doruk Kerim Karinca, Kyle Liangus, Derek Tseng, and Aydogan Ozcan. "Rapid imaging, detection, and quantification of Nosema ceranae spores in honey bees using mobile phone-based fluorescence microscopy." Lab on a Chip, January 28, 2019, https://pubs.rsc.org/en/content/articlelanding/2019/lc/c8lc01342j
  - S. Rajpal, H. Ceylan Koydemir, D. Karinca, Z. Gorocs, A. Ozcan, "Water turbidity detection using a smartphone" (in preparation)
  - D. Karinca, K. Liang, A. Ray, A. Ozcan, "Proof-of-concept blood diagnostics using mobile devices" (in preparation)
- Conference proceedings
  - J. Snow, Columbia Univ., H. Ceylan Koydemir, D. Tseng, D. Karinca, K. Liang, A. Ozcan, "Bee parasite detection using a smartphone", SPIE Photonics West Conference, February 2, 2019, The Moscone Center, San Francisco, CA, USA
  - S. Rajpal, H. Koydemir, Z. Gorocs, D. Karinca, A. Ozcan, "Turbidity measurement using a smartphone," BMES (Biomedical Engineering Society) Annual Meeting, October 17–20, 2018, Atlanta, Georgia, USA
  - H. Ceylan Koydemir, E. Van Dyne, D. Tseng, S. Feng, D. Karinca, K. Liang, R. Nadkarni, R. Varma, and A. Ozcan, "Sickle cell detection using a smartphone based transmission microscope", 17th Annual UC Systemwide Bioengineering Symposium, June 13-15, 2016, University of California, San Francisco, CA, USA
- Oral presentations
  - D. Karinca, K. Liang, J. Snow, H. Ceylan Koydemir, D. Tseng, A. Ozcan, "Bee parasite detection using a smartphone based microscope", May 22, 2018, Undergraduate Research Week, UCLA
  - D. Karinca, K. Liang, J. Snow, H. Ceylan Koydemir, D. Tseng, A. Ozcan, "Bee parasite detection using a smartphone based microscope", May 14, 2018, HHMI Day, UCLA
  - D. Karinca, K. Liang, R. Nadkarni, R. Varma, H. Ceylan Koydemir, E. Van Dyne, D. Tseng, S.W. Feng, A. Ozcan, "Automated detection and classification of sickle cells from whole blood using a smartphone based transmission microscope and machine learning", May 24, 2017, Undergraduate Research Week, UCLA
  - D. Karinca, K. Liang, H. Ceylan Koydemir, D. Tseng, S. W.Feng, A. Ozcan, "A smartphone based microscope to detect sickle cell disease", May 24, 2017, HHMI Day, UCLA

## WORK EXPERIENCE

**Veritas** Santa Clara, CA
*Software Engineering Intern* Jun 2018 – Sep 2018

- Developed authentication client & server compatible with Veritas products using **REST**, Argon2, and **PL/SQL**.
- Designed full-stack product, Veritas License Auto Sync, using **Spring Boot** and **JavaFX** that auto-renews expiring Veritas product licenses, to provide service to 86% of Fortune 500 companies**.**
  - Created UI that lists installed Veritas apps and their license expiration dates for subscription-based apps.
  - Developed login UI that automatically activates Veritas desktop apps purchased by the logged-in user.
  - Integrated **RSA-2048 encryption** in order to securely store passwords on disk so users log in only once.
  - Prevented the need for users to memorize passwords and subscription keys, thereby improving productivity.

**Veritas** Mountain View, CA
*Infrastructure Engineering Intern and Lead Intern* Jun 2017 – Sep 2017

- Wrote **Java** app to analyze any PDF invoice heuristically using Tesseract and LingPipe **NLP,** extracting data such as payment date, tax amount etc, saving companies time and money by eliminating manual data entry.
- Improved navigation experience of license management pane for **Angular**-based web app for customers like Intel, T-Mobile, and BofA.
- Extended **Oracle SQL** database API in **Spring Boot** to provide entitlement insights.
- Organized events and wrote articles on Veritas' on-campus life with interns in the capacity of a lead intern.

**Guitarist and composer** Sep 2011 – Present

- Released solo EP on Spotify: https://open.spotify.com/artist/1Wxt1wEoNTDiR5cvQbXD2Y

## PROJECTS

**TensorFlow Column Comparator (Github: bit.ly/tensorflowcc)** Sep 2018

- Built **TensorFlow** automator in **Python** to find correlating CSV columns using normalization and dynamic hyperparameter optimization. Displayed live progress on training and loss rates.
- Designed console tool to allow data scientists to easily obtain relationships in previously unseen data.

**Uplift (Android app)**: Nov 2016 and April 2015

- Built upvote, post, comment, push notification back-end systems for a social network application that aims to boost the user's mood by prioritizing the display of well-performing posts based on location, using **Node.js**.
- Won Top 10 Prize at LA Hacks, UCLA's hackathon, among 200 teams.
- Won Facebook Award: Best Product among 10 teams, as determined by a jury of Facebook engineers.

**History Slides (web application: historyslides.com):** May 2014

- Implemented slideshow capability, using native **JavaScript,** for a map-based app for interactive history teaching to fill the gap of visualization of history in traditional Turkish education system.
- Built interactive world map in which major WWI events are chronologically highlighted on historical boundaries.

## TECHNICAL SKILLS

- **Proficient:** Python (Numpy), Java (Spring Boot, JavaFX), Node.js, MATLAB, React Native, C, C++, Bash.
- **Basic Knowledge:** TensorFlow, Oracle PL/SQL, C#, Verilog