

# Pablo Cárdenas R.

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## Education

**Massachusetts Institute of Technology (MIT)** — Cambridge, MA, USA

Ongoing

PhD Candidate, Department of Biological Engineering (GPA: 5.0/5.0)

**Universidad de los Andes (Uniandes)** — Bogotá, Colombia

March, 2018

Bachelor of Science *Summa Cum Laude* in Microbiology, minor in Bioinformatics (GPA: 4.84/5.0)

## Research

**Department of Biological Engineering, MIT** — Cambridge, MA

Graduate Research Assistant

Sep 2018 ++

- Designing [molecular and computational tools](#) for transcriptional control, functional genetics, and drug discovery in the malarial parasite *Plasmodium falciparum* (Prof. Jacquín C. Niles)
- Helped design, model, construct, and test a [control system for cell resource sharing in genetic circuits](#) (Prof. Domitilla Del Vecchio, Mechanical Engineering)
- Designed a mathematical model to complement an *in vitro* study of the efficacy and dynamics of a synthetic probiotic system for prevention of gut infection (Prof. James J. Collins)

**Department of Systems Biology, Harvard Medical School** — Boston, MA

Undergraduate Researcher

Feb – Jul 2018

- Helped develop computational workflows for analysis of single-cell imaging (Prof. Johan Paulsson)
- Constructed and applied microfluidic systems to study bacterial physiology and persister cell formation

**Eligo Bioscience** — Paris, France

Research Intern in Synthetic Biology

Aug 2017 – Jan 2018

- Created DNA constructs and bacterial strains for phage production using CRISPR-Cas9 editing
- Screened libraries of synthetic phage candidates against bacterial strains

**Mathematical and Theoretical Biology Institute, Arizona State University** — Tempe, AZ

Undergraduate Researcher

Jun – Jul 2017

- Created a [3D, spatially explicit computational model](#) of bacterial resistance to antibiotics in a biofilm

**Department of Biological Engineering, MIT** — Cambridge, MA

Undergraduate Researcher

May – Aug 2016

- Assembled CRISPR-Cas9 constructs for gene editing in the malaria parasite (Prof. Jacquín Niles)
- Created [software that automates the design of the genome-editing plasmids](#) being assembled *in vitro*
- Carried out a computational genome-wide scan and analysis of Cas9 and Cas12a sites in *P. falciparum*

**Department of Biological Sciences, Uniandes** — Bogotá, Colombia

Undergraduate Researcher

May 2015 - Aug 2017

- Designed and experimentally tested an [ODE model of phage-host dynamics](#) (Prof. Martha Vives)
- Applied Hidden Markov Models to identify phages in human gut metagenomes (Prof. Alejandro Reyes)
- Led an all-student team to create a [statistical model for snakebite forecasting](#) which garnered the Best Project in Biomedical Engineering Award at the May 2015 ExpoAndes Student Fair

## Teaching & Mentorship

### Department of Biological Engineering (BE), MIT — Cambridge, MA, USA

#### Coding Fellow, Biological Engineering Data Lab

Mar 2019 ++

- Providing 1-on-1 coaching for programming and biological data analysis to undergraduates, graduate students, and postdocs at MIT as an inaugural fellow at the [BE Data Lab](#)

#### Teaching Assistant, Principles of Molecular Bioengineering

Sep – Dec 2019

- Assignment and exam design and grading, review lecture sessions, one-on-one tutoring for 40 students (Profs. Ernest Fraenkel and Alan Jasanoff)
- Awarded best Fall 2019 teaching assistant at the MIT Department of Biological Engineering

#### Peer Counsellor, BE Resources for Easing Friction and Stress (REFS)

Jan 2018 ++

- Providing 1-on-1 confidential counselling for graduate students at MIT BE as a member of the [BE REFS](#)
- Underwent a week-long training course on conflict coaching and support resources for grad students
- Working with the MIT BE Department leadership and Grad Student Board to improve graduate experience

### Department of Biomedical Engineering, Uniandes — Bogotá, Colombia

#### Teaching Assistant, Quantitative Human Physiology I and II

Jan – Dec 2016

- Assignment design and grading, review sessions, and teaching main lectures during professor absences for 100 students (Prof. Juan Manuel Cordovez)

### Department of Student Affairs, Uniandes — Bogotá, Colombia

#### Teaching Assistant, Social Practice Program

Jul – Dec 2015

- Trained, guided, and evaluated 60 Uniandes students serving as tutors for low-income high school students (Instructors David Parga and María del Pilar Pérez)

### Department of Biological Sciences, Uniandes — Bogotá, Colombia

#### Teaching Assistant, Parasitology Laboratory

Jan – Jun 2015

- Provided review sessions and tutoring, helped develop and grade assignments, and prepared microscope slides (Instructor Laura Tamayo and Prof. Camila González)

## Publications

#### *dCas9 regulator to neutralize competition in CRISPRi circuits*

2020

H.-H. Huang, M. Bellato, Y. Qian, [P. Cárdenas](#), L. Pasotti, P. Magni, & D. Del Vecchio  
[biorXiv preprint](#), doi: [10.1101/2020.08.11.246561](#).

#### *Host Resistance, Genomics and Population Dynamics in a Salmonella Enteritidis and Phage System.*

2019

A.V. Holguín, [P. Cárdenas](#), C. Prada-Peñaranda, L. Rabelo Leite, C. Buitrago, V. Clavijo, ... & M.J. Vives.  
[Viruses](#), *11*(2), 188.

#### *Cheating the Cheaters: Spatial Dynamics in the Evolutionary Stability of Antibiotic Resistance.*

2018

D. Akman\*, L. Callaway III\*, [P. Cárdenas](#)\*, J. Nieve-Silva\*, J. Chen, B. Espinoza, L. Arriola, C. Castillo-Garsow.  
[Technical report available from MTBI](#), Arizona State University.

\*These authors contributed equally to the work.

## Awards

#### Teaching Assistant Excellence Award, best Fall 2019 TA (MIT Department of Biological Engineering)

Dec 2020

#### Summa Cum Laude, top 1% historic graduates in Faculty of Sciences (Uniandes)

Mar 2018

#### Best Saber Pro Graduate National Exam, Biology (Ministry of Education, Colombia)

Nov 2017

#### Ramón de Zubiría Awards (4), top program GPA (Uniandes)

Nov 2015–Oct 2017

#### Excellence Awards in Microbiology, Biomedical Engineering, and Biology (Uniandes)

Mar 2014–Oct 2017

#### Alberto Magno Award for incoming students (Uniandes)

Oct 2013