Yoshiki Vázquez-Baeza

yoshiki.vazquezbaeza@colorado.edu
http://yoshikee.tumblr.com
(720) 550-3517

PERSONAL STATEMENT

I am passionate about elegant engineering solutions and enjoy my time designing and developing them. As a researcher I am generally interested analyzing high-dimensional datasets and an open source software, and open science advocate.

EDUCATION

Ph. D. computer science, *University of Colorado at Boulder, Boulder, CO. Advised by Rob Knight.* (2013 – Present).

B. S. biomedical engineering, *Universidad Iberoamericana, Mexico City, Mexico. Graduated Magna Cum Laude. Senior thesis advised by Antonio Gonzalez Pena, Jose Luis Urrusti and Rob Knight.* (2008 - 2012).

EXPERIENCE

Research Assistant: *Knight Laboratory at University of Colorado at Boulder (USA).*
August 2013 – Present
Working as a member of a research group focused on understanding the microbiome, additionally, a core developer in the following open source projects:

- **EMPeror**: Emperor a tool for the analysis and visualization of large microbial ecology datasets (mainly built using WebGL, THREE.js, NumPy and PyCogent). http://github.com/qiime/emperor
- **Quantitative Insights Into Microbial Ecology (QIIME)**: Developer of a framework for processing and statistical analysis of microbial datasets (mainly built using NumPy, SciPy, R and Matplotlib). http://github.com/qiime/qiime
- **The American Gut Project**: biggest scientific **crowd-funded**, citizen science effort in human history with the main goal of characterizing the microbiome of thousands of participants around the world thus creating the most diverse human microbiome datasets to ever be publicly and freely available (total funds nearly 1 million USDs). http://github.com/qiime/qiime_web_app

Software Developer: *Knight Laboratory at University of Colorado at Boulder (USA).*
Jan 2012 – August 2013
Designed and developed a spectral analysis methodology for microbial community datasets as part of my undergraduate thesis project. This project implemented machine learning and DSP techniques to provide an insight into the always-changing human microbiome. Throughout this period of time other software-based projects were developed to serve as a foundation for next generation visualization tools and took part in the maintenance and administration of a database system.

Software Developer: *Spanish Charity Hospital (Mexico City).*
June 2011 – December 2011
The project consists on the development and validation of an electrocardiographic detection system for the Brugada Syndrome (a rare condition with a unique waveform signature, responsible of 12% of the sudden

death episodes of young people). I implemented a DSP detection algorithm of the QRS complex of an electrocardiographic signal, designed and implemented a database and currently collaborate on the spectral analysis of an electrocardiographic signal using wavelets to detect the Brugada Syndrome.

Hardware Developer: *Engineering and Technology Center for Rehabilitation of the Universidad Iberoamericana (Mexico City)*.

June 2011 – July 2011.

Designed and manufactured the PCB for Presimed—a system that measures and displays the state of a piezoresistive pressure sensor. The board consists of a pressure sensor that is sampled by a microcontroller, to drive an LED bar to display how much pressure is being applied. The layout was done in a single layer board to minimize the final cost of the product, which I achieved by carefully reselecting and repositioning some of the IC packages.

Hardware developer: *Independent Hardware Development (Mexico City)*.

May 2011 – July 2012.

Designed, manufactured and assembled the PCB for a lamp that varies the illumination color as a function of ambient temperature, going from blue (cold) to red (warm). The 2-layer board has a temperature sensor that is sampled and filtered by a microcontroller to manage the light intensity of a group of RGB LEDs, and the power stage to drive the LEDs.

Teacher Assistant: *Universidad Iberoamericana (Mexico City)*.

January 2011 – May 2011.

Assisted on programming courses, helped students focus on the assignment problems and graded homework.

Instructor: *Software Development Group at Universidad Iberoamericana (Mexico City)*.

January 2011 – May 2011.

Created a programming course focused on Objective-C for iOS as part of activities of the Software Development Group. Taught and graded a group of 15 students (undergrad and grad students) for 5 months.

Project Coordinator and Software Developer: *Software Development Group at Universidad Iberoamericana (Mexico City)*.

February 2011 – July 2012.

Conceived and lead the development of iBero—an iOS application for iPhone that provides accurate and convenient information about Universidad Iberoamericana (Mexico city campus). I worked in the overall design and development of the software to achieve a product as handy as possible for the students of the university. (www.tinyurl.com/uiaIbero).

Project Coordinator and Software Developer: *Engineering and Technology Center for Rehabilitation at Universidad Iberoamericana (Mexico City)*.

September 2010 – July 2012.

Designed and lead the development of Sirumed–a Windows based application that takes the anthropometric data of a patient and calculates the specs of its ideal wheel chair. I designed and developed the GUI (addressed to users with a strong medical background and with basic knowledge of computer use) added a license validator, (used to control the distribution of the software) created an installer to ensure an easy installation and coordinated a group of 5 to implement the software. (http://www.sis.uia.mx/citer/).

Project Coordinator and Software Developer: *Software Development Group at Universidad Iberoamericana (Mexico City)*.

June 2010 – July 2012.

Conceived and lead the development of MATSOL—an iPhone app to solve equation systems and determinants, perform base conversions and calculate resistance, serving as a toolkit for electrical engineering students. I designed and developed the GUI, the solver's engine and coordinated a group of 4 to implement them. (www.tinyurl.com/uiaMatsol).

Software Developer: *Sin Tráfico (Mexico City)*.

February 2009 – April 2009.

Designed and developed a database based in Django to monitor a system's changes via a web-based interface.

PUBLICATIONS

EMPeror: a tool for visualizing high-throughput microbial community data.
Vázquez-Baeza Y, Pirrung M, Gonzalez A, Knight R.
Gigascience. 2013 Nov 26;2(1):16. doi: 10.1186/2047-217X-2-16.

Advancing our understanding of the human microbiome using QIIME.
Navas-Molina JA, Peralta-Sánchez JM, González A, McMurdie PJ, **Vázquez-Baeza Y**, Xu Z, Ursell LK, Lauber C, Zhou H, Song SJ, Huntley J, Ackermann GL, Berg-Lyons D, Holmes S, Caporaso JG, Knight R.
Methods Enzymol. 2013;531:371-444. doi: 10.1016/B978-0-12-407863-5.00019-8.

Meta-analyses of studies of the human microbiota.
Lozupone CA, Stombaugh J, Gonzalez A, Ackermann G, Wendel D, **Vázquez-Baeza Y**, Jansson JK, Gordon JI, Knight R.
Genome Res. 2013 Oct;23(10):1704-14. doi: 10.1101/gr.151803.112. Epub 2013 Jul 16.

From molecules to dynamic biological communities.
McDonald D, **Vázquez-Baeza Y**, Walters WA, Caporaso JG, Knight R.
Biol Philos. 2013 Mar;28(2):241-259. Epub 2013 Feb 5.

VISUALIZATIONS

The assembly of an infant gut microbiome framed against healthy human adults.
https://www.youtube.com/watch?v=Pb272zsixSQ

Gut Ecosystem Restoration via Fecal Transplantation
https://www.youtube.com/watch?v=-FFDqhM4pks

INVITED TALKS AND WORKSHOPS

Strategies and Techniques for the Analysis of Microbial Communities. *Marine Biological Laboratory – Woods Hole, Massachussets* (August 2012 and August 2013).

An Introduction to Microbial Analysis with QIIME. *BioFrontiers Institute, University of Colorado at Boulder – Boulder, Colorado* (November 2012 and February 2013).

Visualizing the Microbial Data Deluge. *Center for Urban Science and Progress, New York University – Brooklyn, New York* (September 2013).

Introduction to QIIME on the IPython Notebook. *California Institute of Technology – Pasadena, California* (September 2013).
The 'crobe Giveth and the 'crobe Taketh Away, an Introduction to QIIME. *Washington University in Saint Louis – Saint Louis, Missouri* (February 2014).

SKILLS AND ACTIVITIES

Co-founder of the Software Development Group (SDG) at Universidad Iberoamericana (2010 – 2012).

Our main function is to encourage students to join real world software developing projects, and help them prepare for programming contests.

Hardware and software developer for the robotics group at Universidad Iberoamericana (2011-2012).

Development of the printed circuit board for the motor driver that controls every articulation of the robot along with the software (written in 16 bit microcontroller) that controls each articulation.

Languages:

Spanish (Native Spanish speaker) and English (15 years of formal education).

Software:

Experience developing software using C, Objective-C, Python (SciPy, NumPy, Matplotlib and IPython), JavaScript, BASH, GTK+, SQL, ASM, PHP, LabVIEW, MATLAB, Mathematica, Eclipse & Xcode. Substantial familiarity using Git, GitHub and SVN.

Experienced with agile and test driven software development.

General experience designing, testing and manufacturing PCBs using Altium Designer.

Project Gallery:

http://www.flickr.com/photos/68265230@N06/sets/
http://github.com/ElDeveloper