Sebastian **Bernasek**

Data Scientist | Chemical Engineer

San Francisco Bay Area

□ 630-624-9699 | Sebernasek@gmail.com | Sebastianbernasek | Sebernasek

Skills

Coding Python & Cython Matlab, Mathematica Linux/Unix, OSX

Git, LaTeX, Adobe CS

Modeling Stochastic processes ODE/PDE systems Machine learning Agent-based modeling **Analysis** Hypothesis testing Bayesian inference Time series Networks

Computer Vision Image segmentation Feature classification Spatial analysis Quantitative microscopy **Process Engineering** Design & optimization Opex/Capex estimation Life cycle analysis, GREET Process simulation, HYSYS

Education

Ph.D. in Chemical and Biological Engineering • 4.0 Northwestern University

2014 - 2019

Dissertation made two exciting discoveries:

- Harmful genetic mutations can be suppressed by slowing metabolism. Published in Cell.
- · Cells can use ratiometric sensing to make reliable fate decisions. Manuscript under review.

B.S. in Chemical Engineering • 3.8 • High Honors University of California, Santa Barbara

2008 - 2012

• Exchange student at Imperial College London throughout 2010/2011.

Experience

Personal Development Present

Took a year off to pursue some personal projects while exploring the world.

Graduate Student at Northwestern University Evanston, IL

2014 - 2019

Developed novel computational methods to study how cell types are defined during the formation of the fruit fly eye:

- FlyEye Analysis: computer vision tools for measuring fruit fly gene expression dynamics. • FlyQMA: computer vision tools for high-throughput quantification and analysis of microscopy data.
- TFBinding: platform for statistical mechanical modeling of transcription factor DNA binding.
- GeneSSA: framework for rapid stochastic simulation of biochemical reaction networks.

Day to day life entailed:

- Exploratory analysis of image and time series data.
- Brainstorming & hackathons for many other data science projects, both social and biological.
- Frequent collaboration to facilitate experimental design and data collection.
- Lots of reading, writing, presentations, and constructive criticism.
- Co-teaching several undergraduate chemical engineering courses and a data science bootcamp.
- Mentoring graduate, undergraduate, and high school students.

Process Engineer at LanzaTech Chicago, IL

2012 - 2014

- Invented three processes for converting waste gases to lipid products. One patent granted, two more applications pending.
- Designed and built the company's core process modeling framework.
- Identified promising technology partners, ultimately leading to major investments.
- · Modeled refinery-scale processes to predict and optimize economic and life-cycle performance.
- · Advised corporate leadership and investors with technical analysis.

Research Assistant at UC Santa Barbara Santa Barbara, CA

2011 - 2012

· Obtained first ever dynamic measurements of interaction forces between vesicles. Published in Soft Matter

Summer Intern at UL Air Quality Sciences Atlanta, GA

Summer 2011

Publications

Ratio-based sensing of two transcription factors regulates the transit to differentiation.

Under Revision

Sebastian Bernasek*, J.F. Lachance*, N. Peláez*, R. Bakker, H. Navarro, L. Amaral, N. Bagheri, I. Rebay, R. Carthew

Expected 2020

Sebastian Bernasek · CV March 30, 2020

Fly-QMA: Automated analysis of mosaic imaginal discs in Drosophila.

Published in PLOS Comp. Biology

Sebastian Bernasek, N. Peláez, R. Carthew, N. Bagheri, L. Amaral

Published in Cell

Repressive gene regulation synchronizes neural development with cellular metabolism.

2019

2019

J. Cassidy*, Sebastian Bernasek*, R. Bakker, R. Giri, N. Peláez, B. Eder, A. Bobrowska, N. Bagheri, L. Amaral, R. Carthew

Doctoral Dissertation

Quantitative analysis of cell fate decisions. Sebastian Bernasek

Direct measurement of interaction forces between charged multilamellar vesicles.

Published in Soft Matter

J. Frostad, M. Seth, Sebastian Bernasek, L.G. Leal

2014

Patents_____

US Patent App. 62/872,869, Methods for Optimizing Gas Utilization.

LanzaTech

Sebastian Bernasek & Co-inventors

Filed 2019

US Patent App. 14/927,950, Fermentation process for the production of lipids.

LanzaTech Filed 2014

Sean Simpson and Sebastian Bernasek

LanzaTech

US Patent 9,783,835, Method for producing a lipid in a fermentation process.

Sean Simpson and Sebastian Bernasek

Granted 2017

Mentorship _____

Simran Khunger High school student

Summer 2017

Project: Designing synthetic benchmarks for 3D segmentation of cell membranes in the larval Drosophila eye.

Darshan Patel Chemical engineering undergraduate

Summer 2016

Project: Probing tradeoffs between efficiency and robustness via in silico evolution of GRN topologies.

Teaching

Chemical Engineering Methods and Analysis

Spring 2018

Reaction Engineering and Kinetics

Spring 2017

Process Engineering and Design

Spring 2016

Data Science Bootcamp

Summer 2015

Reaction Engineering and Kinetics

Spring 2015