César Vargas

Education

2012–2017 **Ph.D. Electrical and Computer Engineering**, *University of Delaware*, Newark, Delaware, USA, PhD Topic: Stochastic Computational System Biology.
Dissertation defense November 14 2017

2009–2012 **Msc computer scientist**, *Universidad Industrial de Santander*, Bucaramanga-Santander, Colombia, *4.6/5*.
Research Topic: Studies on Objective Functions of Metabolic Networks and Flux Balance Analysis (FBA)

2003–2008 **Computer scientist**, *Universidad Industrial de Santander*, Bucaramanga-Santander, Colombia, *4.02/5*.
Graduation Project: Software Enviroment for Mechanism Dinamics Learning in Blood Glucose Metabolic Regulation, Supported in Systems Dynamics-Based Modeling

Publications

[1] Cesar A. Vargas-Garcia, Khem Ghusinga, and Abhyudai Singh. "Cell Size Control and Gene Expression Homeostasis in Single-Cells". en. *Current Opinion in Systems Biology* 8 (Apr. 2018), pp. 109–116.

[2] Cesar Vargas-Garcia, Ryan Zurakowski, and Abhyudai Singh. "Synaptic Transmission May Provide an Evolutionary Benefit to HIV through Modulation of Latency". en. *bioRxiv* (Jan. 2018), p. 243360.

[3] Khem Raj Ghusinga, Cesar A. Vargas-Garcia, Andrew Lamperski, and Abhyudai Singh. "Exact Lower and Upper Bounds on Stationary Moments in Stochastic Biochemical Systems". en. *Physical Biology* 14.4 (2017), 04LT01.

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[6] Abhyudai Singh, Cesar Augusto Vargas-Garcia, and Mikael Bjorklund. "Joint Regulation of Growth and Division Timing Drives Size Homeostasis in Proliferating Animal Cells". en. *Submitted to Biophysical Journal* (Aug. 2017), p. 173070.

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[8] Miguel Angel Marquez-Castellanos, Cesar Augusto Vargas-Garcia, and Henry Arguello-Fuentes. "Compact Spatio-Spectral Algorithm for Single Image Super- Resolution in Hyperspectral Imaging". *Revista Ingeniería e Investigación* (2016). 00000.

[9] Mohammad Soltani, Cesar Augusto Vargas-Garcia, Duarte Antunes, and Abhyudai Singh. "Intercellular Variability in Protein Levels from Stochastic Expression and Noisy Cell Cycle Processes". *PLOS Comput Biol* 12.8 (2016). 00000, e1004972.

[10] Cesar Augusto Vargas-Garcia, M. Soltani, and A. Singh. "Conditions for Cell Size Homeostasis: A Stochastic Hybrid System Approach". *IEEE Life Sciences Letters* 2.4 (Dec. 2016), pp. 47–50.

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[11] Mohammad Soltani, Cesar Augusto Vargas-Garcia, and Abhyudai Singh. "Conditional Moment Closure Schemes for Studying Stochastic Dynamics of Genetic Circuits". *IEEE Transactions on Biomedical Circuits and Systems* PP.99 (2015). 00000, pp. 1–1.

[12] Hoover Fabián Rueda-Chacon, Cesar Augusto Vargas-Garcia, and Henry Arguello-Fuentes. "Single-Pixel Optical Sensing Architecture for Compressive Hyperspectral Imaging". *Revista Facultad de Ingeniería Universidad de Antioquia* 73 (2014). 00000, pp. 124–133.

[13] Carlos Eduardo Garcia-Sanchez, Cesar Augusto Vargas-Garcia, and Rodrigo Gonzalo Torres-Saez. "Predictive Potential of Flux Balance Analysis of Saccharomyces Cerevisiae Using as Optimization Function Combinations of Cell Compartmental Objectives". *PLoS ONE* 7.8 (2012), e43006.

* KRG and CAVG contributed equally to this work.

In preparation

[14] LaMont Cannon and Cesar Augusto Vargas-Garcia. "HIV 2-LTR Experiment Design Optimization". *To be submitted* (2017).

[15] Cesar Augusto Vargas-Garcia, Jiefu Li, LaMont Cannon, and Ryan Zurakowski. "ddPCR and qPCR Accuracy Comparison Using Probability Theory and Computation". *To be submitted* (2017). 00000.

Peer Reviewed Conference Papers

[16] J. A. Blotnick, C. A. Vargas-García, J. J. Dennehy, R. Zurakowski, and A. Singh. "The Effect of Multiplicity of Infection on the Temperateness of a Bacteriophage: Implications for Viral Fitness". *2017 IEEE 56th Annual Conference on Decision and Control (CDC)*. Dec. 2017, pp. 1641–1645.

[17] L. Cannon, A. Jagarapu, C. A. Vargas-Garcia, M. J. Piovoso, and R. Zurakowski. "Implications of Measurement Assay Type in Design of HIV Experiments". *2017 IEEE 56th Annual Conference on Decision and Control (CDC)*. Dec. 2017, pp. 4106–4111.

[18] Cesar Augusto Vargas-Garcia, Carl Agemabiese, and Abhyudai Singh. "Optimal Adsorption Rate: Implications of the Shielding Effect". *2017 American Control Conference (ACC)*. May 2017, pp. 2140–2145.

[19] LaMont Cannon, Cesar Augusto Vargas-Garcia, Michael J. Piovoso, and Ryan Zurakowski. "Prospective HIV Clinical Trial Comparison by Expected Kullback-Leibler Divergence". *ACC16*. 00000. 2016.

[20] Cesar Augusto Vargas-Garcia, Mohammad Soltani, and Abhyudai Singh. "Stochastic Hybrid Systems Approach to Modeling Dynamics of Cell Size". *2016 IEEE 55th Conference on Decision and Control (CDC)*. 2016, pp. 5863–5868.

[21] Ryan Zurakowski and Cesar Augusto Vargas-Garcia. "ddPCR and qPCR Accuracy Comparison Using Probability Theory and Computation". 2016.

[22] Mohammad Soltani, Cesar Augusto Vargas-Garcia, Niraj Kumar, Rahul Kulkarni, and Abhyudai Singh. "Approximate Statistical Dynamics of a Genetic Feedback Circuit". *American Control Conference (ACC), 2015*. 00000. 2015, pp. 4424–4429.

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[25] Abhyudai Singh, Cesar Augusto Vargas-Garcia, and Rajesh Karmakar. "Stochastic Analysis of Genetic Promoter Architectures with Memory". *2013 IEEE 52nd Annual Conference on Decision and Control (CDC)*. 00000. 2013, pp. 7217–7222.

[26] Cesar Augusto Vargas-Garcia, Ryan Zurakowski, and Abhyudai Singh. "Conditions for Invasion of Synapse-Forming HIV Variants". *2013 IEEE 52nd Annual Conference on Decision and Control (CDC)*. 00000. 2013, pp. 7193–7198.

[27] Erwing Fabian Cardozo, Cesar Augusto Vargas-Garcia, and Ryan Zurakowski. "A Compartment Based Model for the Formation of 2-LTR Circles after Raltegravir Intensification". *2012 IEEE 51st Annual Conference on Decision and Control (CDC)*. 2012, pp. 4924–4929.

[28] Carlos Eduardo Garcia-Sanchez, Cesar Augusto Vargas-Garcia, Henry Arguello-Fuentes, and Rodrigo Gonzalo Torres-Saez. "Computational Flux Balance Analysis (FBA) of New Representative Objective Functions Using a Multiple Compartmental Objective Approach and Its Application to Saccharomyces Cerevisiae Biological Behavior". *ISCB Latin America 2012 Conference on Bioinformatics*. Santiago, Chile: ISCB, 2012.

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[30] Cesar Augusto Vargas-Garcia, Fabián Cardozo, Hugo Andrade, Alvaro Gómez, Gerardo Mantilla, and Alfonso Mendoza. "Mechanisms for Metabolic Regulation of Glucose Levels in Blood: An Approach from Systems Dynamics". *Sexto Congreso Latinoamericano de Dinámica de Sistemas*. Universidad de Talca, Universidad Adolfo Ibañez, Universidad Diego Portales, Universidad Andrés Bello. Santiago de Chile Chile, 2008.

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ArXiv-BiorXiv

[32] Khem Raj Ghusinga, Cesar Augusto Vargas-Garcia, Andrew Lamperski, and Abhyudai Singh. "Bounds on Stationary Moments in Stochastic Chemical Kinetics". *arXiv:1612.09518 [q-bio]* (2016). arXiv: `1612.09518 [q-bio]`.

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[35] Khem Raj Ghusinga, Cesar Augusto Vargas-Garcia, and Abhyudai Singh. "A Mechanistic First–Passage Time Framework for Bacterial Cell-Division Timing". *arXiv:1512.07864 [q-bio]* (2015). 00000. arXiv: `1512.07864 [q-bio]`.

[36] Mohammad Soltani, Cesar Augusto Vargas-Garcia, Duarte Antunes, and Abhyudai Singh. "Decomposing Variability in Protein Levels from Noisy Expression, Genome Duplication and Partitioning Errors during Cell-Divisions". en. *bioRxiv* (2015). 00000, p. 026559.

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Colombian journals

[38] Ariolfo Camacho-Velasco, Cesar Augusto Vargas-Garcia, and Henry Arguello-Fuentes. "A Comparative Study of Target Detection Algorithms in Hyperspectral Imagery Applied to Agricultural Crops in Colombia". *Tecnura* 20.49 (2016), pp. 86–99.

[39] Ariolfo Camacho, Cesar Augusto Vargas-Garcia, Fernando Rojas, Sergio Castillo, and Henry Arguello. "Hyperspectral Remote Sensing: Overview in Colombia, Applications and Challenges in Geology". *Revista Facultad de Ingenierías* (2015). 00000.

[40] Cesar Augusto Vargas-Garcia, Carlos Eduardo Garcia-Sanchez, Henry Arguello Fuentes, and Rodrigo Gonzalo Torres-Saez. "Balance de Flujos Metabólicos en Saccharomyces cerevisiae basado en Compartimentalización Intracelular". es. *Revista Colombiana de Biotecnología* 15.2 (2013). 00000, pp. 18–28.

[41] Cesar Augusto Vargas-Garcia, Henry Arguello-Fuentes, and Rodrigo Gonzalo Torres-Saez. “Predicción a escala genómica de Componentes de Saccharomyces cerevisiae mediante Análisis de Balance de Flujos”. es; en. *Revista Colombiana de Biotecnología* 14.1 (2012). 00000, pp. 93–107.

Other

[42] Ryan Zurakowski, Cesar Augusto Vargas-Garcia, and Abhyudai Singh. *Cell-Cell Transmission May Allow HIV to Modulate the Probability of Latency*. Workshop. Miami, USA, 2013.

[43] “Seis Estudiantes Seleccionados Para Pasantía En La Universidad de Delaware - Observatorio de Medios” (2011). 00000.

[44] Cesar Augusto Vargas-Garcia. *Face Recognition Using Principal Component Analysis, OpenCV and EmguCV*. Universidad Cooperativa de Colombia, Bucaramanga, Colombia, 2011.

Experience

2018–present **Professor**, *Fundación Universitaria Konrad Lorenz*, Bogotá, Colombia.

2012–2018 **Research Assistant**, *University of Delaware*, Newark, Delaware, USA.

2009–Present **Research Assistant**, *High-dimensional Signal Processing Group (HDSP), Universidad Industrial de Santander*, Bucaramanga, Colombia.

2011 **Full time, Assistant Teacher.**, *Universitaria de Investigación y Desarrollo*, Bucaramanga-Santander, Colombia.
Computational Structures (Java, C++, Basic Programming), School of Systems Engineering

2011 **Research Internship**, *University of Delaware*, Newark, Delaware, USA.
Research Internship with professor Ryan Zurakowski, School of Electrical and Computer Engineering, HIV Virus Dynamics

2009–2011 **Adjunt Professor, Assitant Lecturer**, *Universidad Industrial de Santander*, Bucaramanga-Santander, Colombia.
Computational Structures (Java, C++, Basic Programming), School of Systems Engineering

2007–2011 **Research Student**, *Research Group in Biomedical Engineering* , Bucaramanga-Santander, Colombia.

Honors

- Academic excellence award, High Dimensional Signal Processing Research Group, Universidad Industrial de Santander, 2016
- Bioengineering Faculty Award, University of Delaware, Fall 2013
- Meritorious graduation work, Universidad Industrial de Santander, December 2012
- Research Assistant Scholarship, ECE, UDEL, fall 2012
- Best poster presentation in session "Functional genomics and systems biology", ISCB Latin America 2012 Conference on Bioinformatics, 2012
- Personal Support Scholarship, Universidad Industrial de Santander, 2009-2010

Leadership Activities

High Dimensional Signal Processing Research Group - Colombia

- Co-Advisor Msc Project. Finished December 2015. Grade: 4.8/5.0
- Co-Advisor Undergraduate Project. Finished December 2015. Grade: 4.8/5.0
- Co-Advisor Undergraduate Project. Finished December 2010. Grade: 4.8/5.0

- Research Assistant Leader

Links

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- **Google scholar:** https://scholar.google.com/citations?user=csX8l60AAAAJ&hl=en
- **Researchgate:** https://www.researchgate.net/profile/Cesar_Vargas-Garcia

Skills

- C
- Mathematica
- Python
- Matlab
- R
- Multi-language pipline coding

References

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