

## CURRICULUM VITAE

### Personal Information

Mario Antonio Ayala Valenzuela

Nationality: Mexican

Jesus Villanueva Gutierrez 584

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### Current Activity

PhD. student in Applied Mathematics

Delft University of Technology

Areas of Interest: Markov Processes,

Interacting Particle Systems, Scaling limits, Duality,

Dirichlet forms

Since January 2017

Expected graduation: December 2020

### Previous Education

Delft University of Technology

Master in Applied Mathematics

Areas of Interest: Markov Processes,

Interacting Particle Systems, Scaling limits, Duality

Additional specialization:

Financial Engineering

Master thesis work:

Hydrodynamic limit for the Symmetric Inclusion Process

August 2016

Universidad de Colima

Facultad de Ciencias

B.S. Mathematics

B.S. thesis work:

Estimation of the basic reproductive number for HLB in  
the state of Colima Mexico

July 2011

## **Work Experience**

Consultant  
Dubai Community Development Authority  
August 2017  
Dubai, United Arab Emirates  
Project: Under NDA

Consultant  
Dubai Airports Authority  
July 2017  
Dubai, United Arab Emirates  
Project: Under NDA

Intern  
Ministry of Finance  
Dutch State Treasury Agency  
March 2016-July 2016  
Project: Analysis of Dutch Inflation Bonds

Administrative Support  
Ministry of Health of the State of Colima  
January 2007- June 2014

## **Teaching Experience**

Teacher assistant  
Stochastic Differential Equations  
Period: February 2020- July 2020  
Institution: Delft University of Technology

Teacher assistant  
Analyse en differentiaalvergelijkingen  
Period: September-November 2019  
Institution: Delft University of Technology

Teacher assistant  
Linear Algebra  
Period: November- Present 2019  
Institution: Delft University of Technology

Lecturer (In Spanish)  
Numerical methods  
Period: August-December 2018  
Institution: Universidad de Colima

Trainer of the Mexican Mathematical Olympiad  
Period: January 2005- December 2010  
Institution: Universidad de Colima  
Colima, Mexico

## **Publications**

### **In preparation:**

Hydrodynamic limits on varying dimensions  
Subject: Derivation of Hydrodynamic equation  
in spaces with varying dimensions

### **Submitted:**

Higher order fluctuation fields and orthogonal duality  
Submitted: Electronic Journal of Probability  
Join work with: Gioa Carinci and Frank Redig  
<https://arxiv.org/abs/2004.08412>

Condensation of SIP particles and sticky Brownian motion  
Submitted: Journal of Statistical Physics  
Join work with: Gioa Carinci and Frank Redig  
<https://arxiv.org/abs/1906.09887>

### **Published:**

Quantitative Boltzmann Gibbs principles via orthogonal polynomial duality  
Journal of Statistical Physics  
Join work with: Gioa Carinci and Frank Redig  
<https://link.springer.com/article/10.1007/s10955-018-2060-7>

### **Technical Reports:**

An epidemiological approach to the dynamics of chytridiomycosis in a harlequin frog population  
Technical report for the Mathematical and Theoretical Biology Institute  
Arizona State University  
Tempe, Arizona, Summer 2006

Evaluation of Aedes Aegypti control campaigns  
Technical report for the Health Ministry of the State of Colima in Mexico.  
Secretaria de Salud Colima  
Colima, Col, Fall 2009

## **Talks**

Higher order Fluctuation Fields and  
Orthogonal Duality Polynomials  
The third Haifa Probability School  
Workshop on Random Geometry and Stochastic Analysis  
Israel Institute of Technology  
Haifa Israel  
February 25th 2020

Condensation of SIP particles and sticky Brownian motion  
The 27th Meeting of PhD students in Stochastics in the Netherlands  
May 2019

Condensation of SIP particles and sticky Brownian motion  
NDNS+ PhD Days 2019  
May 2019

Sistemas de partículas que interactúan y aplicaciones a modelos de distribución de la riqueza.  
Seminario interno del grupo académico 105, Facultad de Economía  
Universidad de Colima  
Villa de Alvarez, Colima, México  
Febrero 2018.

Contributed:

An epidemiological approach to the dynamics of chytridiomycosis in a harlequin frog  
population  
Technical report for the Mathematical and Theoretical Biology Institute  
Arizona State University  
Tempe, Arizona, Summer 2006

An epidemiological approach to the dynamics of the chytridiomycosis in a harlequin frog  
population  
SIAM Conference on the Life Sciences  
Raleigh, North Carolina  
July 31 - August 4, 2006

## **Poster Presentation**

Condensation of SIP particles and sticky Brownian motion  
LMS Research School : Random Structures: From the discrete to the continuous  
University of Bath  
July 1st to 5th, 2019

An epidemiological approach to the dynamics of the chytridiomycosis in a harlequin frog  
population

SIAM Conference on the Life Sciences  
Raleigh, North Carolina  
July 31 - August 4, 2006

An epidemiological approach to the dynamics of the chytridiomycosis in a harlequin frog population  
SACNAS Undergraduate and Graduate Students Posters in Mathematics  
2006 SACNAS National Conference  
Tampa , Florida  
October, 2006

### **Attended Conferences/Schools**

The third Haifa Probability School  
Workshop on Random Geometry and Stochastic Analysis  
Israel Institute of Technology  
Haifa Israel  
February 24th-28th, 2020

LMS Research School : Random Structures:  
From the discrete to the continuous  
University of Bath  
July 1st to 5th, 2019

Geometry and Scaling of Random Structures  
CIMPA SCHOOL  
Universidad de Buenos Aires, Argentina  
July 2018

Pre-School: Stochastic Dynamics out of Equilibrium  
CIRM (Centre International de Rencontres Mathématiques),  
Marseille, France  
April, 2017

VIII Escuela de Probabilidad y Procesos Estocásticos  
CIMAT, Guanajuato, México  
September, 2016

7th General AMaMeF and Swiss Quote Conference  
Advanced Mathematical Methods in Finance  
Lausanne , Switzerland  
September, 2015

Mathematical and Theoretical Biology Institute (MTBI)  
Arizona State University  
Tempe, Arizona, Summer 2006

### **Honors and Awards**

Recipient of Mexican National Council of Science and Technology Scholarship  
PhD. Studies at Delft University of Technology

Recipient of Mexican National Council of Science and Technology Scholarship  
Master Studies at Delft University of Technology

17th Mexican Mathematical Olympiad (National )  
Bronze Medal  
Guanajuato Mexico, November 2003

Mathematical Skills Contest (National )  
Instituto Tecnológico y de Estudios Superiores de Occidente, ITESO  
1st Place  
Jalisco Mexico, January 2003

### **Computer skills**

Matlab (Advanced user)  
Python, R (Intermediate)  
Javascript (Intermediate)

### **Interests (Other than mathematics)**

Chess  
Anime

### **References**

Name: Prof. Frank Redig  
E-mail: f.h.j.redig@tudelft.nl  
Affiliation: TU Delft

Name: Dr. Gioia Carinci  
E-mail: gioia.carinci@unimore.it  
Affiliation: University of Modena and R. Emilia